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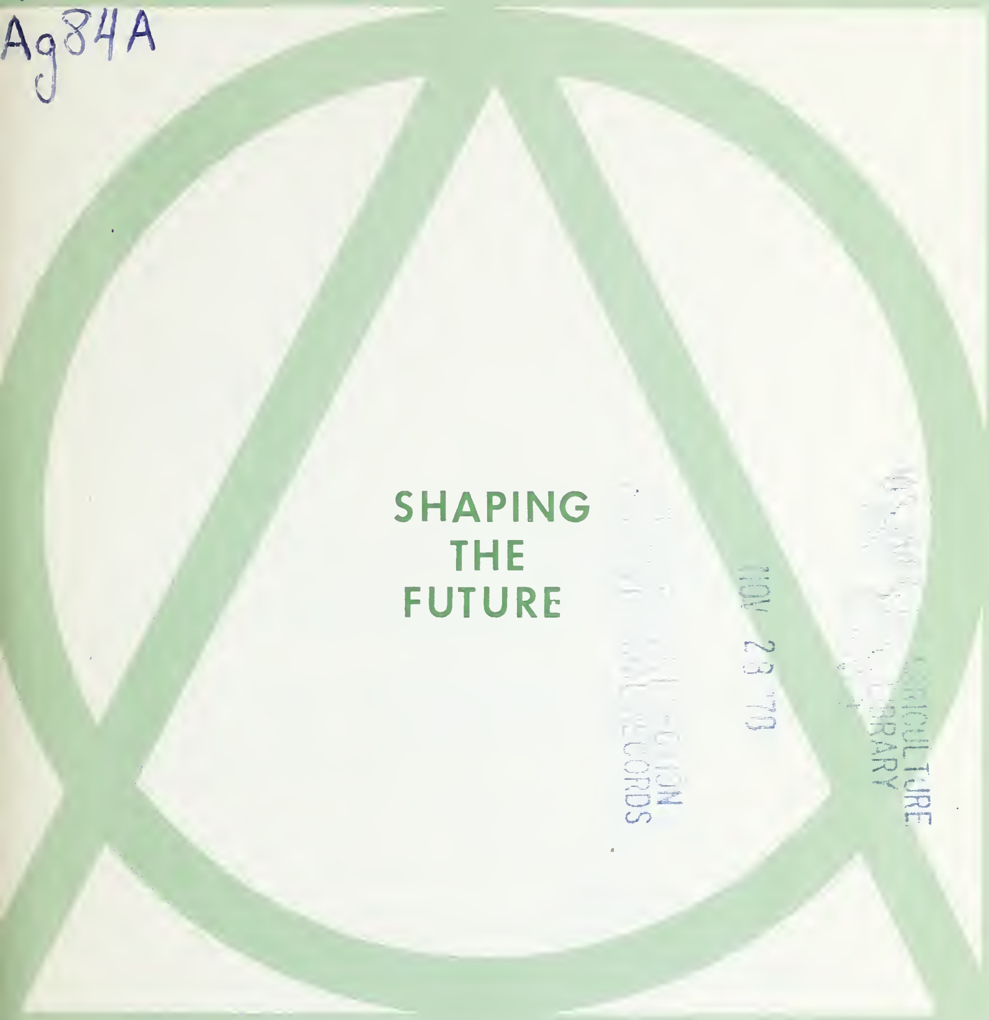

SHAPING
THE
FUTURE

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REPORT of the SECRETARY of AGRICULTURE 1971

Department of Agriculture
Washington, D. C.

The President
The White House
Washington, D. C.

Dear Mr. President:

It is my privilege to present to you this report entitled, "Shaping the Future," an account of the services rendered by the U. S. Department of Agriculture to American farmers and rural people and the entire Nation during 1971.

It is with pride in the dedicated and able public servants who make the USDA an immensely valuable arm of the Federal Government that I submit to you my first annual report as Secretary of Agriculture.

Sincerely,

Earl L. Butz

Earl L. Butz
Secretary of Agriculture

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MAY 1972

WHERE WE STAND

"The Nation has made significant progress in these first years of the Seventies."[1]

On today's fast-changing national and international scenes, every year might aptly be called a year of transition. But the phrase is especially descriptive as applied to American agriculture in 1971.

Of paramount significance in agriculture's transition was the fact that the new latitude in decisionmaking provided by the Agricultural Act of 1970 won wide acceptance. U.S. farmers made more of their own farm operating decisions in 1971 than in any other year since the early 1930's.

The year's events offered other impressive evidence that agriculture is rapidly moving into a new era. Farm output climbed sharply. Agricultural exports achieved a spectacular gain. New records were set also in food assistance, farm housing, disaster relief for farm people, and in programs for rural development and environmental improvement.

STATE OF THE AGRICULTURAL ECONOMY

Agriculture's strong income performance in the second half of 1971 offset a weak first half. Gross farm income for the year rose $2 billion above the level of 1970. Production expenses, however, also rose by $2 billion, due in part to inflationary pressures. Except for the new economic program initiated in mid-August, farm operating costs would have climbed even higher.

We estimate the net income realized by farm operators in 1971 at about $15.7 billion, the same as in 1970. Since this income was divided among fewer farms, the average realized net return per farm rose to $5,468, compared with $5,374 in 1970. Farm assets and agricultural equity also increased.

The farm earnings of farm people, however, tell only part of the income story. Farm people derive almost as much earnings from nonfarm sources as they do from farming. The total income of the farm population from all sources reached a record high of more than $28 billion in 1971. Disposable personal income averaged $2,692 per person in 1971, compared with $2,546 a year earlier, and $2,193 in 1968.

On the other hand, the comparable figure in 1971 for nonfarm people was $3,623—over $900, or 35 percent, more per person than was received by farm people.

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[1] This quotation and all others at the beginning of chapters are from the President's State of the Union Message, January 20, 1972.

Production and Supplies

In 1971, the year of the sharpest increase in total farm output since the 1940's, farm production climbed to another new high, rising by about 9 percent—12 percent for crops, 2 percent for livestock. The year saw a record wheat crop, a record corn crop, a record soybean crop, a record output of all feed grains.

For American consumers this meant continued abundance. For farmers it meant *super-abundance* and distressed prices for some of their crops.

To counter the possibility of another round of blight such as caused the short corn crop in 1970, farmers increased corn plantings heavily in 1971. Paradoxically, Southern corn leaf blight caused problems because it *failed* to strike as hard as expected.

The record production of 1971 assures adequate supplies of almost all agricultural commodities and products for the 1971-72 marketing season. We anticipate further increases in meat supplies in 1972. The 1972 carryovers of wheat and feed grains are expected to rise, but soybean and cotton stocks will decline.

The Export Situation

Among the brightest agricultural aspects of the year was the upsurge in farm exports to a record $7.8 billion in fiscal 1971, 15 percent above the previous alltime high of 1970.

Despite the dock strikes, the picture for the calendar year was nearly as good—$7.7 billion total exports—due to heavy shipments in the first half of 1971 and a record December ($842 million).

As in recent years, the principal markets were the European Community and Japan. These two outlets took $3 billion worth of U.S. agricultural products—or close to 40 percent of the total.

Soybeans and their products, wheat and flour, and feed grains accounted for more than $4 billion—or more than 50 percent of all U.S. farm exports.

Largely because of the dock strikes, our agricultural exports during the current fiscal year could be down by as much as $400 million.

Nevertheless, there is reason to be optimistic about our future farm exports. The United States and the other major trading nations of the world have a growing opportunity to set the international community on a new course—toward a system in which the people of the world benefit fully from their growing expertise and ability to produce. But this will happen only when each country has the general freedom to trade those commodities it is best able to supply.

AGRICULTURE'S NEW DIRECTION

Despite the overproduction of grains, 1971 marked a healthy turning point in farm program policies. Because of the Agricultural

Act of 1970, farmers are no longer tied to the rigid allotments and bases long employed as production controls. They have more freedom to decide how they will use their land, skills, climate, equipment, and markets.

About 85 percent of the Nation's eligible base acres and allotments were enrolled in commodity programs in 1971 and made major cropping changes. Over a period of years these farms have made cropping changes involving 60 million acres. A substantial part of this shift came in 1971.

The Corn Belt was more heavily concentrated in its highest profit crops—corn and soybeans; the Northern Plains in wheat and barley at the expense of oats. Producers in the Southern Plains planted more sorghums for their growing livestock industry, the Midsouth expanded soybean production, and cotton producers began a near revolutionary shift toward the most efficient production areas.

These production shifts, by reducing operating costs per unit, will enable our farmers to compete more effectively in world markets.

For 1972, we have refined the concept of farmer decisionmaking that is the heart of the set-aside approach provided by the 1970 Act. Substitution opportunities for farmers who take part in the set-aside programs have been increased. In 1971, a producer with a wheat, feed grain, or cotton base who wished to maintain that base had to plant a portion of his base to corn, sorghum, wheat, or cotton. In 1972, the farmer can protect his base by planting an appropriate percentage to corn, sorghum, wheat, barley, or soybeans.

Farmers will now be able to take better advantage of the various options offered by the set-aside approach. Some producers were already committed to a course of action when the 1970 Agricultural Act became law. Others failed to grasp all of the possible combinations or options available to them. With a year's experience under the new program, more farmers will take advantage of the opportunity to produce for the market.

Obviously, the long-time problem of adjusting production to market needs continues, but we expect 1972 to produce clear indications that we are on the right track.

IMPROVING AMERICAN NUTRITION

Another achievement of high significance in 1971 was the progress made in the massive national drive against hunger and malnutrition.

Since the historic Presidential hunger message of May 6, 1969, and under new and expanded programs provided by the Congress, the number of needy persons helped by the Food Stamp and Commodity Distribution programs has climbed to more than 14.8 million—more than double the 6.9 million participants of 1969. The total value of bonus food stamps—added food-buying power—

soared from $20 million a month in 1969 to a level of $150.0 million in December 1971.

The number of needy children receiving school lunches climbed to 8.1 million in December 1971, more than double the number 2½ years earlier.

The Food and Nutrition Educational Program carried out by Extension Service continued to grow throughout 1971. The number of nonprofessional aides serving EFNEP families during the year increased from about 6,600 to 9,500.

The number of families enrolled in the program increased by more than 100,000 during the year, bringing the total to roughly 350,000 families, or more than 1.6 million individuals. Families enrolled since the inception of the program now exceed 600,000.

While large-scale efforts will still be required to fulfill the national commitment to eliminate hunger in America for all time, achieving the goal has now become a realistic hope.

NEW OPPORTUNITIES IN THE AMERICAN COUNTRYSIDE

Mobility is a dominant and highly visible characteristic of the American people. The rural to urban migration, which has had such a striking impact on the structure of American society since the end of World War II, is continuing but at a less rapid pace. The stream of U.S. population is still flowing in general from the interior to the coasts, and especially to California, Florida, Texas, and, to a lesser degree, New York. These trends have contributed to the much discussed problems of metropolitan overgrowth and the deterioration of a multitude of rural communities.

A continued injection of increased vitality to rural areas of our country is essential to the building of a stronger, better balanced Nation. But if rural areas are to develop, they must have adequate community facilities and services. With the steadily growing needs for schools, water and sewer systems, roads, and other governmental facilities severely straining State and local resources, effective Federal action is urgently needed.

The rural development programs of the Department of Agriculture reached a funding level in 1971 double that of 1969—$2.8 billion compared with $1.4 billion. Housing loan outlays by the Farmers Home Administration increased from less than $500 million in fiscal 1968 to a current record-high level of $1.6 billion.

A record number of families enjoyed the convenience of running water in their homes for the first time during 1971 as the result of the largest water and sewer construction effort in a single 12-month period ever conducted by the Department of Agriculture. The loan program was expanded 15 percent over fiscal 1971 levels for the current fiscal year. The current program will fund more than 1,500 water-waste disposal systems and provide at least 20,000 full-time jobs in rural areas.

The Rural Electrification Administration had the most successful and active year in REA's 36-year loan program history. REA electric borrowers built more than 25,000 miles of line and added 245,000 consumers. The telephone loan program provided improved service to a million subscribers and initial telephone service to 1.4 million. The National Rural Utilities Cooperative Finance Corporation, established to bring in needed outside financing, made its first loans in February 1971, and the Rural Telephone Bank became a reality in May.

TOWARD A QUALITY ENVIRONMENT

The quality of the American environment is another great concern of the Department. Water and air pollution, chemical residues in soil, feed, and food, the problem of disposing of livestock wastes, the encroachment of urbanization and industrialization on some of the Nation's finest farmland, and a general deterioration of the landscape in cities and countryside have given environmental protection and improvement a top national priority.

The solutions to these disturbing problems will require concerted efforts by government at all levels, by industry, agriculture, and John Q. Public.

In the USDA we are stressing interagency action—involvement of all our conservation agencies, research, Extension, our credit agencies, every part of the USDA which has activities bearing on our natural resources and the environment.

Steady growth continues in the development of water resources through watershed projects. As of the close of 1971, a cumulative total of 776 projects had entered the construction stage. We are also moving forward with major, multicounty Resource Conservation and Development Projects, with a total of 98 approved to date.

During fiscal 1971, roughly 2.2 million cooperators in 3,027 soil and water conservation districts throughout the country applied or maintained soil and water conservation practices on 766 million acres.

To replace timber harvested, 302,000 acres of National Forest lands were planted and seeded to trees. Tree planting in the United States is proceeding at a rate of about 1 billion trees per year.

Forest fires burned about 237,000 acres in the National Forests during 1971, less than half the acres burned in 1970.

The Rural Environmental Assistance Program in 1971 put additional priorities on enduring conservation and pollution abatement practices.

Late in the year USDA announced, in consultation with the Department of Interior, the start of a water bank program at a $10 million funding level. Its major purpose will be to encourage farmers to help preserve, restore, and improve the Nation's migratory waterfowl wetlands, thus yielding additional agricultural and environmental benefits.

During the year, USDA and State experiment station scientists came up with improvements in food processing to reduce the amount of pollution dumped into streams. Several research projects studied systems for disposal of livestock wastes and a number of demonstration projects on livestock waste management were conducted by Extension. Researchers are developing promising ways to recycle many kinds of waste materials for future use. They are also studying methods of controlling air pollution from agricultural sources, including investigations on disposal of materials through burning without contaminating the environment.

PROGRESS THROUGH RESEARCH

Different periods in national and world history bring different needs, and different needs require new emphases in research. Thus, today we must have not only a constant stream of research to enable producers to replace less productive means of farming and marketing with more productive methods but also a continuing flow of new information to help combat ecological threats, including the ever-changing insect and disease pests.

During the year, Federal and State researchers came up with a higher yielding variety of soybeans, a breeding line of carrots with more vitamin A, cabbage lines with more vitamin C, and potatoes with higher protein content. The year also saw impressive developments in plant breeding research of a more basic nature which promise great future benefits.

Scientists found a way to reduce the cost of processing rubber, developed new foods, including peanut chips and a peanut pie mix, and found plant seeds that are rich in L-dopa (useful in treating Parkinson's disease).

Research on harvesting and market quality produced an inexpensive new foam to protect vegetable crops against unexpected spring freezes, several modifications of mechanical equipment for harvesting fruits, vegetables, and nuts, processes to improve the marketing quality of citrus products, and ways to reduce insect losses in stored products.

The year's highlight in the never-ending battle against pests and diseases was the successful campaign against Venezuelan equine encephalomyelitis, a dangerous type of horse sleeping sickness which is usually fatal to the animals affected and which also causes illness in man.

A massive mobilization of animal health forces confined VEE to 25 counties in south Texas by spraying millions of acres to check disease-carrying mosquitoes and by vaccinating 2.8 million horses in 19 States and the District of Columbia.

Hog cholera has been almost eliminated from the United States, and the goal is to eradicate the disease completely by the end of 1972. There was an increased invasion of screwworms from Mexico and the screwworm eradication program was continued.

Under the quarantine inspection program more than 800,000 lots of unauthorized agricultural material were seized at ports of entry into the United States. Approximately 40,000 major pests were intercepted during the year.

Remote sensors and sophisticated tracking techniques were used in a pilot program to provide early warnings to farmers on outbreaks of crop diseases.

Research on agriculture's use of chemicals and on alternative means of controlling insects and diseases was sharply expanded. A pilot project to eradicate the boll weevil through an integrated program combining insecticides with cultural and biological controls was carried out in parts of Mississippi, Alabama, and Louisiana. The program sharply reduced populations of this cotton pest.

An integrated approach was also used against the gypsy moth, one of the most damaging threats to forests in the Northeast.

The Department is cooperating with the National Science Foundation, the Environmental Protection Agency, State Departments of Agriculture, Experiment Stations, and Extension Services in implementing a broad new post management action program and an expanded research program. The goal is to help farmers control pests more effectively and economically, while at the same time reducing the use of DDT and other chemical pesticides.

This program provides for a combination of chemical, biological, and cultural pest control techniques, as well as long-range pest control research. It should enable farmers to reduce pesticide use in the years ahead, thus helping to protect the environment while reducing farmers' production costs and safeguarding consumers from increased costs for food and clothing.

OTHER DEVELOPMENTS

Continuing our efforts to increase USDA effectiveness in carrying out its missions, we examined agencies and programs with a view to furthering organizational and management improvements.

The fiscal year saw the completion of a Departmentwide study to improve reporting and related paperwork that saved over $10 million through the elimination of some 2,026 reports and the improvement of 605 others. In its efforts to reduce costs of operation of necessary programs the Department is working toward a cost reduction goal of $99,172,958 in fiscal 1972. This objective, we hope, will be exceeded, as was last year's goal.

We look forward to reaping long continued benefits from an aggressive ADP management program that has generated in excess of $300,000 in savings in fiscal 1972, and is just beginning. This program complements and supports our efforts to improve management effectiveness through the consolidation of administrative systems.

A central voucher processing service where all administrative payments will be made from one location is being established. This function was previously performed in 215 locations thoughout the country. The new concept will produce substantial savings in administrative costs and will also improve service to thousands of vendors.

To further improve the effectiveness of the Department's vigorous efforts to safeguard civil rights for all, an Office of Equal Opportunity was established at the Department staff level on November 16, 1971. This Office has overall responsibility for ensuring that civil rights requirements are met by USDA agencies. Its activities include developing Departmentwide equal opportunity policy, evaluating agency implementation of such policy, reviewing audits and other reports related to civil rights aspects of agency operations, conducting a selected number of civil rights compliance reviews, and coordinating with other Federal agencies to ensure uniform application of the law.

The Department is pursuing the objectives of the Equal Employment Opportunity program with increased emphasis on changes and improvements in agency plans and actions in Washington and in the field.

A major portion of the reorganization of USDA's meat and poultry inspection program, announced in November 1970, was implemented in 1971. A realignment of duties improved and quickened relationships with consumers, State administrations, and industry.

A new Rural Environmental Assistance Program (REAP) was established. REAP makes farmers partners in the venture between the Federal, State, city, and local governments in dealing with the pressing problems of pollution, especially water pollution.

The Agricultural Stabilization and Conservation Service undertook a comprehensive plan to devise the most modern and effective methods of administering farm programs. The work is spearheaded by 10 management analysis task forces composed of 130 persons representing all levels in the agency: County offices, commodity offices, State offices, other field offices, and Washington headquarters.[2]

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[2] Early in 1972 a new regulatory agency, the Animal and Plant Health Inspection Service, was established, and the Consumer and Marketing Service was renamed the Agricultural Marketing Service. The Foreign Economic Development Service was transferred to the Economic Research Service to promote the more effective carrying out of international development functions in the lower income countries.

By focusing on refining and updating existing programs, USDA's Consumer and Marketing Service specialists continued to maintain an organized capability to manage the Nation's food supply in case of national emergency. Radiological monitoring capabilities and "food profiles" for each State were updated. Training of industry, State, and county emergency food management personnel was also reemphasized.

In order to cripple the illicit dope industry by cutting off its largest source of supply, the Department is assisting with money and agricultural expertise the government and farmers of Turkey to wipe out the production of opium poppies. An agricultural team studied the seven Turkish provinces that produced opium and developed a specific program and policy recommendations to enable Turkish farmers to find agricultural alternatives for the poppy.

On May 7, a nationwide "Salute to Agriculture" was held with a special program at the White House in which President Nixon participated. The event was designed to focus national attention on the contributions made by American agriculture.

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As this summary indicates, 1971 was indeed a year of transition for American agriculture. As such, it will inevitably have major repercussions in shaping the future not only of agriculture and rural America but of the whole Nation. Farmers are moving toward freer market-oriented production. Agriculture is also undertaking an enlarged role in the fight for adequate nutrition in America, for a climate of opportunity in the countryside, and for a quality environment.

In the following sections of this report we will discuss in more detail the agricultural accomplishments of 1971.

STRENGTHENING THE AGRICULTURAL ECONOMY

"The strength of American agriculture is at the heart of the strength of America."

During 1971, U.S. agriculture progressed further toward its major goals. With farmers making more of their own farm operating decisions, the advance in agricultural efficiency and output per man-hour continued. Spurred by an especially sharp increase in crop production, farm output soared to a new high. There was a spectacular jump in agricultural exports. Gross income reached a new high, but farm production expenses kept pace so that realized net income from farming remained at the 1970 level. However, net income per farm and disposable personal income of persons on farms rose.

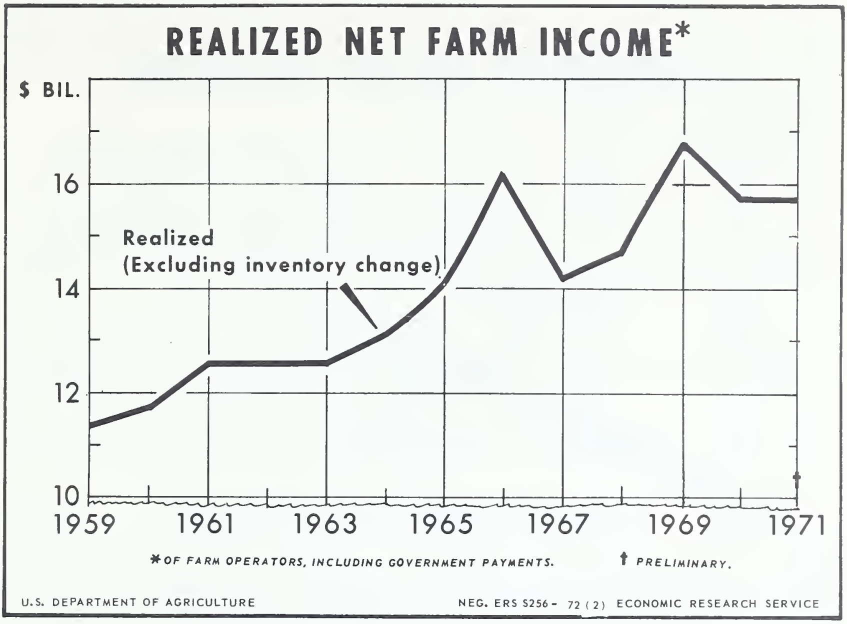
FARM INCOME

After a generally disappointing income performance in the first half of 1971, agriculture closed out the year on an upswing. For the 12 months, gross farm income was up by $2 billion. Production expenses, however, kept pace due in part to inflationary pressures which were not dampened until the new economic program was initiated in mid-August.

Consequently, realized net income from farming in 1971 remained at the level of $15.7 billion as in 1970. But with farm numbers continuing to decline, average net income per farm rose to $5,468, compared with $5,374 in 1970.

Total earnings of the farm population from all sources reached a record $28 billion in 1971. Farm people earned more income than ever before from nonfarm sources, principally wages and salaries. The after-taxes per capita income of the farm population rose to a new high of about $2,690, nearly $150 more than in 1970.

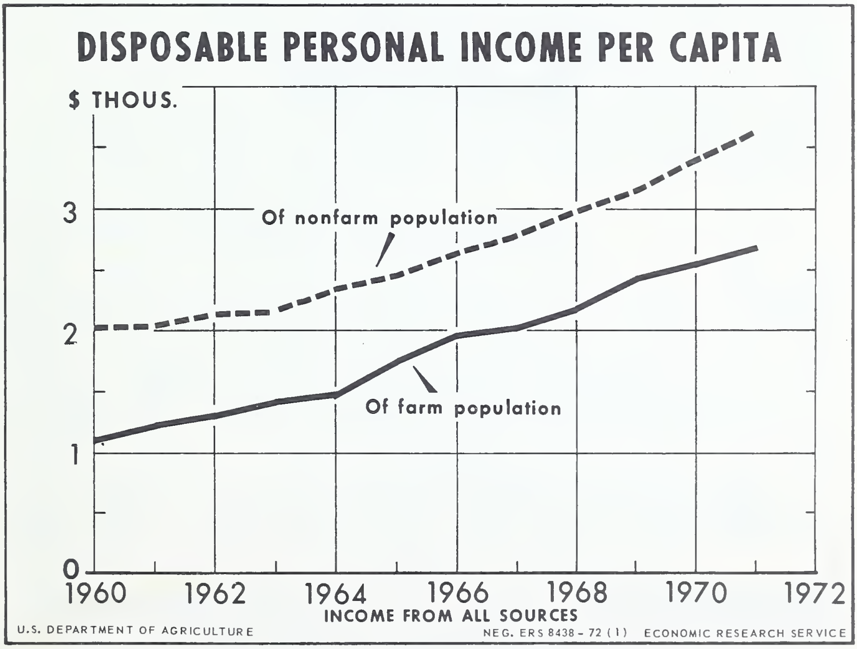
The Nation's farm residents in 1971 averaged roughly 75 percent as much disposable personal income from all sources as nonfarm residents, about the same as in 1970, but well above the 55-percent ratio of 1960. While farm people have improved their relative income position, a wide disparity in the incomes of farm and nonfarm Americans still exists. It is vitally important that farm people should share more equitably in American economic growth.



REALIZED NET FARM INCOME*

*OF FARM OPERATORS, INCLUDING GOVERNMENT PAYMENTS. † PRELIMINARY.

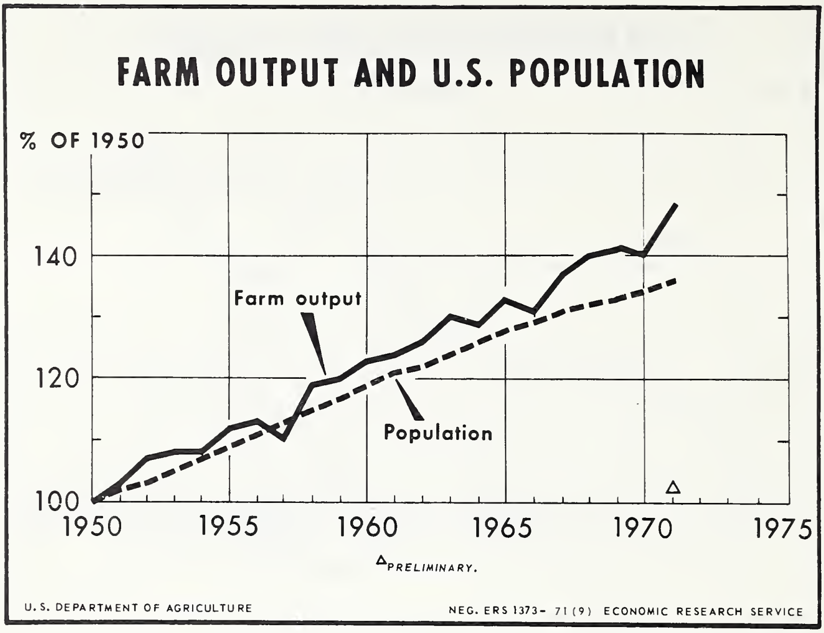
U.S. DEPARTMENT OF AGRICULTURE NEG. ERS S256 - 72 (2) ECONOMIC RESEARCH SERVICE



DISPOSABLE PERSONAL INCOME PER CAPITA

INCOME FROM ALL SOURCES

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 8438 - 72 (1) ECONOMIC RESEARCH SERVICE



FARM OUTPUT AND U.S. POPULATION

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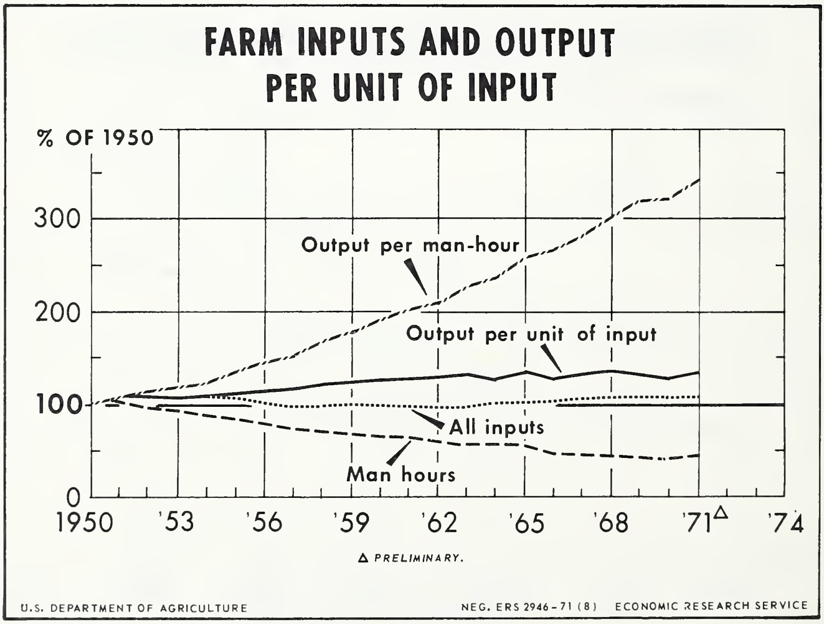


FARM INPUTS AND OUTPUT PER UNIT OF INPUT

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 2946-71 (8) ECONOMIC RESEARCH SERVICE

The following table shows comparative income data:

	1970 Billion dollars	*1971* Billion dollars
Realized gross farm income	56.6	58.6
Farm production expenses	40.9	42.9
Realized net income of farm operators (realized gross income minus expenses)	15.7	15.7
	Dollars	Dollars
Realized net farm income per farm	5,374	5,468
Disposable personal income per capita		
Farm population, all sources	2,546	2,692
Nonfarm population, all sources	3,399	3,623
Farm as percentage of nonfarm (Pct.)	74.9	74.3

PRODUCTION AND SUPPLIES

Farm production climbed to another new high in 1971, rising almost 9 percent, the sharpest annual increase since the 1940's. Production of livestock was up 2 percent but crop output increased by 12 percent. Farmers harvested 302 million acres of the 59 major crops, nearly 5 percent more than in 1970.

With farm production per man-hour continuing to move upward, each farm worker on the average supplied enough food and fiber for about 49 persons—42 persons at home plus 7 abroad. Twenty years ago, only about 16 persons were supplied by the efforts of each farm worker. U.S. farmers have been increasing their productivity at a remarkable rate. Between 1961 and 1971, output per man-hour for farm work increased by about three-fourths, in contrast to an increase of roughly 30 percent for nonfarm workers.

Food Prices, Consumption, and Expenditures

The wage-price freeze in the second half of 1971 moderated the rate of retail food price increases to 3 percent, a significantly better record than the 5½-percent increase of 1970. Prices of food consumed at home rose by 2.4 percent, largely because prices for crop foods increased 4.7 percent. Lower pork and egg prices helped limit livestock price increases to 0.3 percent, despite a 10-percent increase in fish prices and higher prices for beef and dairy products. Prices for food away from home rose less than 5 percent, sharply less than increases in other recent years. The overall rise in food prices was significantly less than the rise for other consumer and services items.

American consumers spent $118 billion for food in 1971, up less than 4 percent from the preceding year. But the portion of disposable income spent for food dropped to an alltime low of 16.0 percent, compared with 16.6 percent in 1970.

The average person consumed 1.1 percent more food than in 1970, which was slightly more than the increase of a year earlier. The per capital consumption of livestock products rose more than 1½ percent, largely because the average person ate 9½ percent more pork. Consumption of crop foods, on the other hand, rose less than 0.5 percent.

Meat and Eggs

Paced by a sharp rise in pork production and a moderate increase in beef, output of red meat rose significantly in 1971. Production of lamb and mutton remained about the same as in 1970, but veal output dropped considerably. Poultry and eggs were up slightly.

While farmers received $1 per 100 pounds more for cattle and calves than in 1970, lamb prices were lower and hog prices were down about $4 per 100 pounds. Broiler prices were somewhat higher, and turkey remained near the 1970 levels, but egg prices dropped sharply.

We expect further increases in meat supplies in 1972. Moderate increases in production of beef and broilers will be only partially offset by a sizable reduction in pork production. Egg supplies may decline moderately as the laying flock is reduced.

Dairy

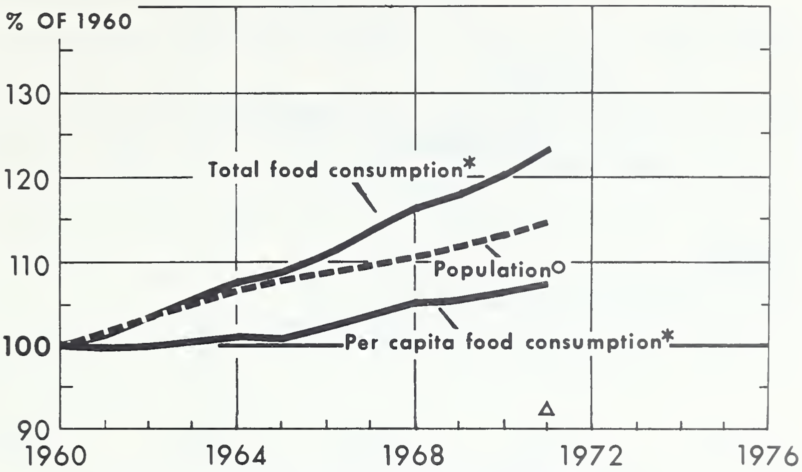
Continuing a rise that began in 1970, milk production in 1971 totaled 118.6 billion pounds, 1.5 billion pounds more than a year earlier. The number of milk cows declined only 1 percent during 1971, the smallest drop since the mid-1950's. Output per cow has increased about 2½ percent annually during the past 5 years, and reached 9,609 pounds in 1971.

Larger farm marketings of milk along with little change in commercial disappearance of milk in all dairy products led to a substantial rise in USDA's removals of dairy products from the market through price-support and related programs. These removals were equivalent to 7.3 billion pounds of milk compared with 5.8 billion pounds in 1970, and were the largest for any calendar year since 1967.

Farm prices for milk have risen steadily since 1965. The average price of $5.86 per 100 pounds in 1971 (compared with $5.71 in 1970) was about 40 percent more than in 1965. Farmers' cash receipts from sales of milk and cream totaled $6.8 billion in 1971, $6.5 billion in 1970, and $5 billion in 1965.

Per capita consumption of milk by civilians which has been declining for years, averaged only 557 pounds in 1971, 7 pounds less than in 1970 and about 100 pounds per person less than in 1960. Per capita sales of nonfat dry milk, fluid whole milk, butter, cream, and evaporated milk have declined since 1960, but sales of low fat fluid milk, ice milk, cheese, and sherbet have increased. Ice cream sales per capita have held about steady. Substitutes, such as

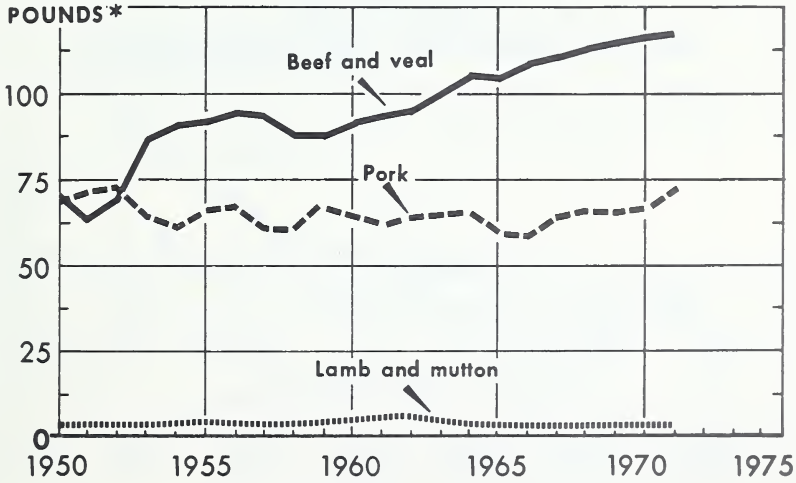
POPULATION AND FOOD CONSUMPTION



*RETAIL WEIGHT BASIS, USING CONSTANT RETAIL PRICES AS INDEX WEIGHTS.
○CIVILIAN POPULATION JULY 1: 50 STATES BEGINNING 1960. △ PRELIMINARY.

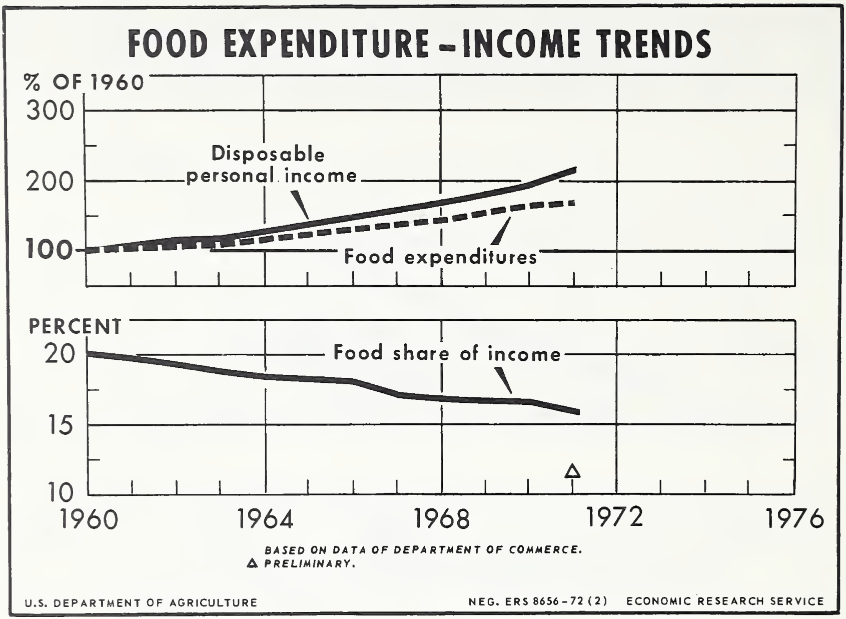
U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 5492-72 (2) ECONOMIC RESEARCH SERVICE

MEAT CONSUMPTION PER PERSON



*CARCASS WEIGHT BASIS.

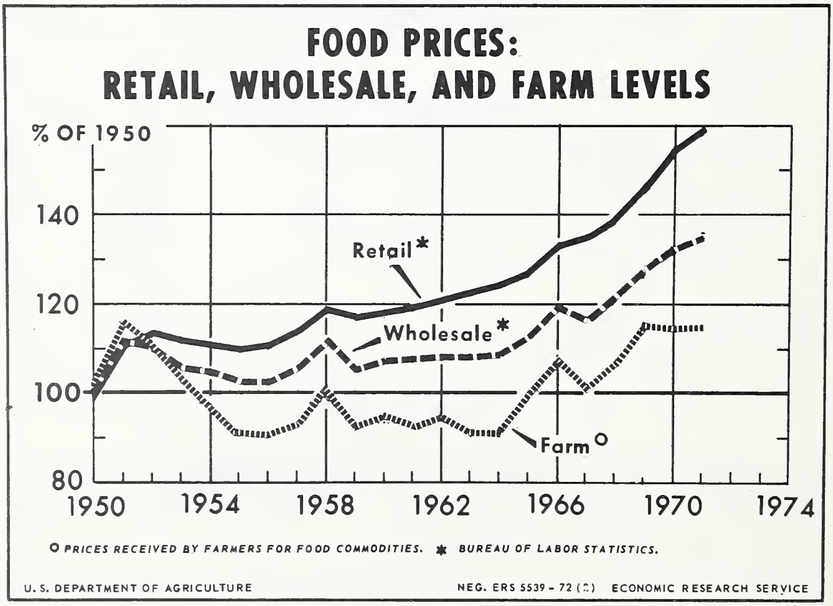
U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 442-72 (2) ECONOMIC RESEARCH SERVICE



FOOD EXPENDITURE – INCOME TRENDS

BASED ON DATA OF DEPARTMENT OF COMMERCE.
△ PRELIMINARY.

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 8656-72 (2) ECONOMIC RESEARCH SERVICE



FOOD PRICES:
RETAIL, WHOLESALE, AND FARM LEVELS

○ PRICES RECEIVED BY FARMERS FOR FOOD COMMODITIES. * BUREAU OF LABOR STATISTICS.

U. S. DEPARTMENT OF AGRICULTURE NEG. ERS 5539-72 (2) ECONOMIC RESEARCH SERVICE margarine, coffee whiteners, and nondairy whipped toppings still cut into the markets for dairy products, but competition from filled and imitation milk continued to slacken.

Declines in commercial holdings of cheese and canned milk, and heavy export sales of CCC butter reduced year-end stocks of dairy products to the equivalent of 5.1 billion pounds of milk (fat solids basis), compared with 5.8 billion in 1970. CCC stocks of nonfat dry milk also were down and less was available for program use than at the end of 1970.

Dairy imports dropped to 1.3 billion pounds milk equivalent, one-fourth below the 1970 level. This was due to increased restrictions on entries and to reduced world dairy supplies, the dock strikes, and monetary uncertainties. U.S. exports of dairy products increased six-fold to the equivalent of 2.5 billion pounds of milk as 128 million pounds of CCC butter were sold for export, chiefly to Great Britain.

Wheat

Wheat supplies for 1971-72 total 2.4 billion bushels, 5 percent above a year earlier and the largest since 1962-63. A 9-percent rise in harvested acreage combined with record yields to produce an alltime high wheat crop of 1,640 million bushels in 1971.

We estimate domestic use of 825 million bushels in 1971-72, up 5 percent from 1970-71. Wheat feeding is likely to be up about 15 percent from the 209 million bushels of 1970-71. Food and seed use will differ little from the year earlier level.

With larger world supplies and dock strikes limiting 1971-72 shipments, we expect total wheat exports of 515 million bushels, about a fifth below 1970-71.

If total disappearance declines 8 percent, as anticipated, the wheat carryover would soar to 970 million bushels in mid-1972, the largest carryover in 9 years.

Soybeans

Sparked by continued strong demand for both soybean oil and meal, soybean utilization during 1970-71 soared to a record 1,255 million bushels—about 3 percent above the previous year and the seventh consecutive year in which use has expanded. Since total usage exceeded 1970 production by 131 million bushels, carryover stocks were reduced from 230 million bushels on September 1, 1970, to around 100 million in 1971. However, the rate of growth in usage was well below the recent long-term annual average of about 8 percent, and was sharply below the spectacular leap of nearly 30 percent in the preceding year.

Soybean crushings rose by 3 percent to 760 million bushels—about 85 percent of annual crushing capacity. Heavy use of soybean oil both domestically and abroad and strong export demand for meal were major factors in the record crush. Rising soybean prices caused foreign buyers to reduce inventories and substitute competitive commodities where possible; consequently, bean exports were unchanged from last season's 433 million bushels. The season average price of $2.85 per bushel for 1970 crop soybeans was 50 cents above the average for the previous year, and the highest in over 20 years.

Soybean supplies in 1971-72 are estimated at 1,268 million bushels, or about 6 percent below the previous season and 12 percent below 1969-70. Sharply reduced stocks more than offset gains in production, bringing supplies to the lowest level since 1967-68.

We expect demand for soybeans to continue strong during 1971-72, although smaller supplies may limit total utilization to about 1.2 billion bushels, a little under the 1970-71 record. But usage still is expected to exceed production for the third consecutive year, reducing carryover stocks as of September 1972 to one of the lowest levels of the past 5 or 6 years. With supplies down and demand strong, farm prices of soybeans may average about $3 per bushel, compared with $2.85 last season and the current price support of $2.25.

Feed Grains

Responding to a highly favorable growing season, feed grain production in 1971 climbed to 205 million tons, 47 million more than the short crop of 1970 and 29 million above the previous record of 1967. The 1971-72 feed grain supply, including the smaller carryover, totaled 239 million tons, 15 percent larger than last season and 12 percent more than the 1965-69 average.

Between early summer and the fall of 1971, when the big crops were harvested, feed grain prices dropped by more than one fourth. This brought a marked improvement in livestock-feed price relationships for livestock and poultry producers, and it will result in a resumption of the upward trend in feed consumption. Consequently, domestic use in 1971-72 may increase by 5 to 7 percent over the 154 million ton usage of 1970-71.

Despite larger U.S. supplies and lower prices than last year, export demand has been hurt by dock strikes and larger feed crops in other countries, but still may equal or exceed last season's shipments of 20.6 million tons. Since the bumper U.S. feed grain crop in 1971 is more than adequate to meet anticipated domestic and export needs, carryover will probably increase by around two-thirds over the relatively low level of 34 million tons in the fall of 1971.

Cotton

The 1971 cotton crop of 10.5 million bales was about 0.4 million bales more than the small 1970 crop. The larger output stemmed primarily from an increase of 3 percent in harvested areas. Generally unfavorable growing and harvesting conditions allowed only a 1-percent gain in yields. Weather and insect problems again plagued several areas of the Cotton Belt, particularly the Southwest.

The increased acreage largely reflected the more liberal planting provisions of the Agricultural Act of 1970. To give farmers more flexibility, marketing quotas and penalties were suspended. Producers were also guaranteed a support price of 35 cents per pound on output from the 11½ million national base acreage allotment.

Demand for U.S. cotton strengthened substantially during 1970-71. A sharp expansion in exports and slightly higher U.S. mill use lifted disappearance to a 3-year high of 11¾ million bales. Primarily because of a sharp drop in foreign free-world cotton production and slightly greater consumption, shipments increased a million bales above the reduced level of the previous year. U.S. mill use recorded its first gain since 1965, as competition from domestically produced manmade fibers and imported cotton textiles moderated.

We expect disappearance of U.S. cotton during 1971-72 to total about 11 million bales, which would be moderately below the level of last season. Reduced export prospects are responsible. Shipments may decline by about one-fifth, or to around 3 million bales, due to smaller U.S. supplies and higher prices, particularly for the lower grades and shorter staples, and larger production in other free-world countries. In contrast, U.S. mill use may benefit from the recent upturn in textile mill activity, despite tighter cotton supplies and higher prices. On balance, it appears likely that American mills again will use close to last season's total of 8.1 million bales.

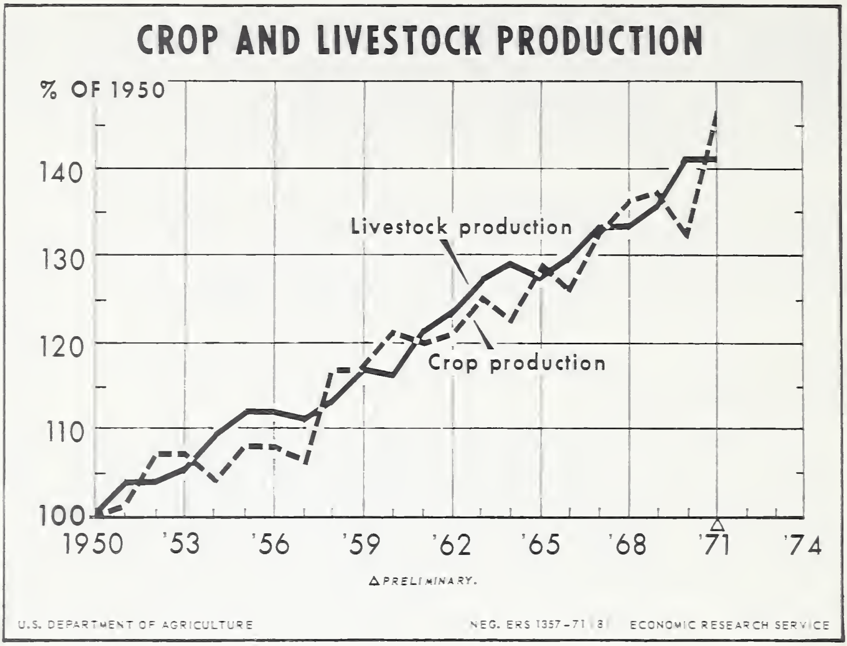
Cotton supplies tightened in 1970-71 because of smaller beginning stocks. The estimated 1971-72 supply of 14¾ million bales is down over a million from 1970-71 and the smallest since 1947. The August 1971 carryover of 4¼ million bales was the smallest since 1952.

A further decline in stocks is likely during 1971-72 as combined mill use and exports, although down from last year, still will likely exceed the 1971 crop. Thus, stocks as of August 1972 may drop to around 3½ million bales.

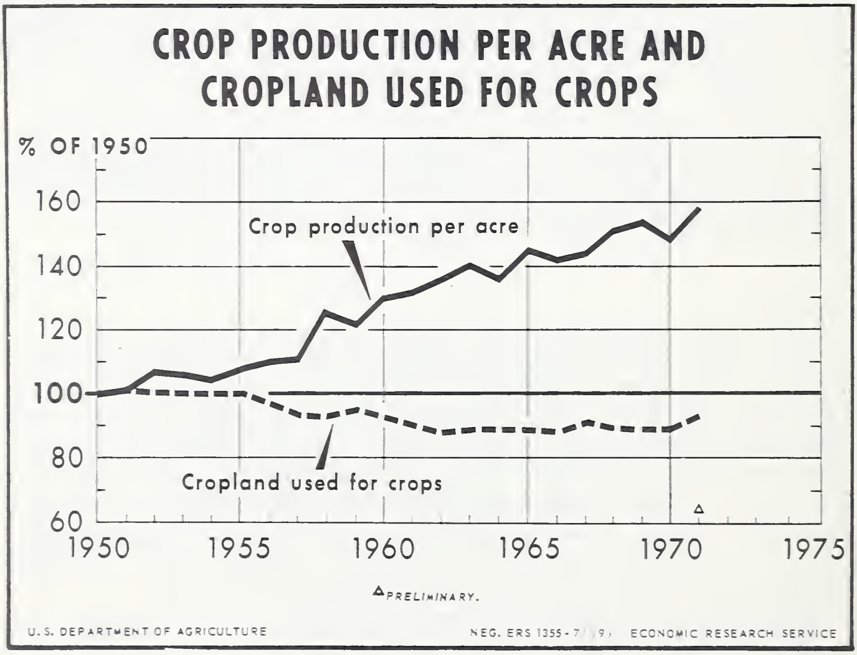
Tobacco

The 1971 tobacco crop totaled almost 1.8 billion pounds, 8 percent less than in 1970. For flue-cured, the effective acreage poundage quota in 1971 was reduced 10 percent; and burley growers, under poundage controls for the first time, cut output 3 percent. The harvested acreage of 843,000 acres was down 6 percent. Per acre yield averaged 2,078 pounds, 2 percent short of the 1970 record. Prices for the 1971 crop averaged 7 percent above the 72.8 cents per pound received in the 1970-71 season. This was the seventh consecutive year of record prices.

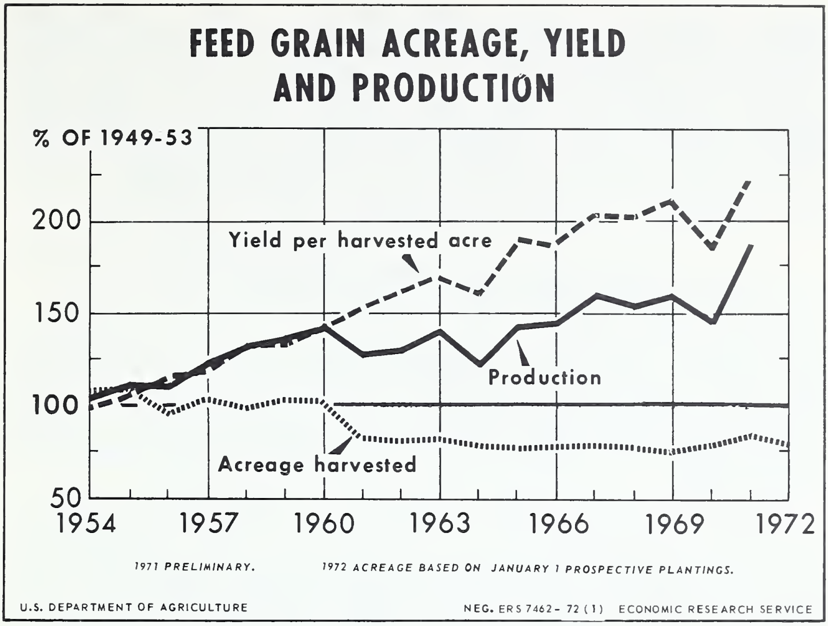
Carryover stocks of tobacco, continuing to decline, totaled 3.65 million pounds (July 1, 1971, for flue-cured and cigar wrapper types; October 1 for other). Total supplies were 2 percent lower, but still remained ample. With declines in prospect both for



CROP AND LIVESTOCK PRODUCTION



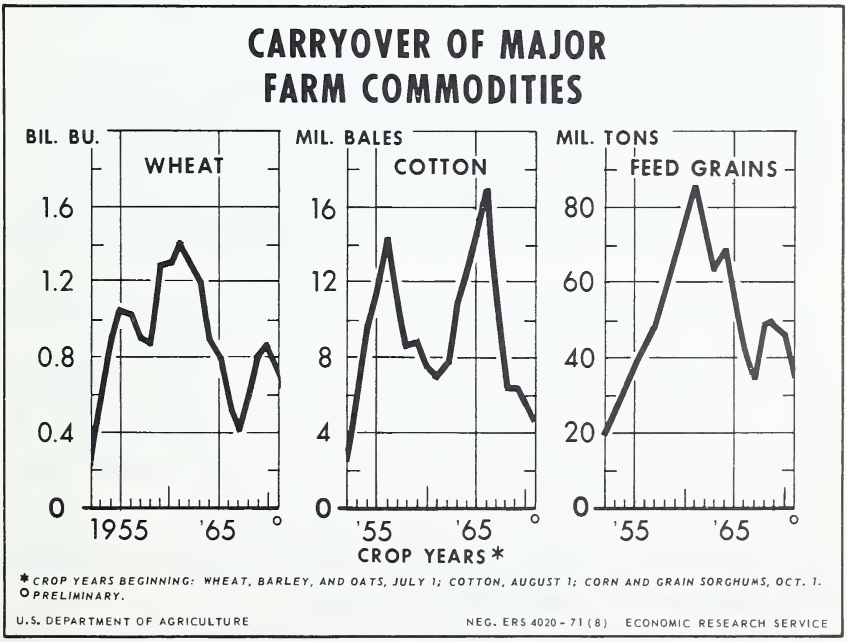
CROP PRODUCTION PER ACRE AND CROPLAND USED FOR CROPS



FEED GRAIN ACREAGE, YIELD AND PRODUCTION

1971 PRELIMINARY. 1972 ACREAGE BASED ON JANUARY 1 PROSPECTIVE PLANTINGS.

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 7462-72 (1) ECONOMIC RESEARCH SERVICE



CARRYOVER OF MAJOR FARM COMMODITIES

* CROP YEARS BEGINNING: WHEAT, BARLEY, AND OATS, JULY 1; COTTON, AUGUST 1; CORN AND GRAIN SORGHUMS, OCT. 1.
o PRELIMINARY.

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 4020-71 (8) ECONOMIC RESEARCH SERVICE

domestic use and exports, disappearance in 1971-72 may total slightly below last year's 1.94 billion pounds. A continuing reduction in domestic use of U.S. tobacco would reflect little change in cigarette output, but a further drop in tobacco per cigarette. In the United Kingdom, a major U.S. export destination, manufacturers are seeking less costly tobaccos from other countries as they plan for entry into the European Common Market.

THE EFFECT OF NEW FARM POLICIES

The year 1971 marked a major turning point in the direction of farm program policies—in practical terms away from producing crops for government payments and toward producing crops for the marketplace. This trend toward a more market-oriented or market-sensitive agricultural policy began with passage of the Agricultural Act of 1970.

Under the new legislation, farmers are no longer tied to the rigid allotments and bases long used as production controls. Farmers now have more freedom to decide how they will use their land, skills, climate, equipment, and markets. With greater freedom for decisionmaking, farmers can more readily change their production patterns to reduce costs and improve efficiency. At the same time, the program continues to give farmers a relatively high degree of price and income protection through direct payments, commodity loans, and through taking land out of production under the set-aside to prevent surpluses.

The vast majority of eligible U.S. farmers took advantage of their expanded decisionmaking freedom to shift their cropping patterns away from their historical bases and allotments and thus strengthen their profit potential. Roughly 85 percent of the Nation's eligible base acres and allotments were enrolled in commodity programs in 1971. Over a period of years farmers have made cropping changes involving 60 million acres. A substantial part of this shift occurred in 1971.

The Corn Belt was more heavily concentrated in corn and soybeans—its highest profit crops—than at any time in history.

Northern Plains producers went more heavily into wheat and barley at the expense of oats, which they formerly produced on acres they were not allowed to plant to more profitable crops.

Southern Plains producers, on the other hand, planted more sorghums for their rapidly growing livestock industry.

Cotton production began a near revolutionary shift toward the most efficient production areas, such as the Mississippi Delta and the High Plains and Rolling Plains of Texas.

Midsouth producers expanded their soybean production in response to good soybean market prospects.

These production shifts are helping make U.S. agriculture more efficient and more competitive, a vital point in an industry such as agriculture which depends heavily on exports. As farmers reduce their production costs by rearranging their farming enterprises, they can boost net profits and put themselves in a better position to win markets and increase sales.

The following examples illustrate how farmers reacted to their new decisionmaking freedom:

> Two South Dakota farmers a few miles apart benfited by shifting in opposite directions. One, a cattle rancher who raises feed for his livestock, has also been raising wheat to preserve his wheat allotment. He shifted out of wheat, concentrating on alfalfa and corn. The other farmer, who has a cash grain operation, is equipped to raise wheat and wants to concentrate on it. The set-aside program let him drop such less profitable crops as flax and oats that he produced only because, under the old programs, his cropping choices were restricted.
>
> Most farmers near Greenwood, Ind., specialize in corn and soybeans. But some dropped feed grains and switched entirely to wheat, because they felt the market for soft white wheat will be stronger now that millers will have to bid for their Midwest acres against feed grain and soybeans.
>
> A Texas High Plains farmer with a shortage of water shifted from irrigated grain sorghum to increased cotton acreage. He can water his cotton crop once and get a fairly good yield. In past years, he was limited to a 60-acre cotton allotment. With no penalty for overplanting, he increased his 1971 cotton plantings to 300 acres, which he was able to handle without increased labor and equipment costs.

Benfits from the set-aside program would have been even greater except for two factors: The threat of Southern corn leaf blight and the untimely dock strikes.

Paradoxically, Southern corn leaf blight caused problems because it *failed* to strike as hard as expected. Anticipating that the disease would seriously cripple corn production, the 1971 programs were designed to take 19 million fewer acres out of crop production than in 1970. And, at planting time, farmers increased their corn plantings by 11 percent. Good weather and reduced severity of the blight resulted in a record corn crop far exceeding consumption.

Even under the previous farm programs, the additional acres would have been freed up to guard against the corn blight threat. However, it is significant that farmers themselves decided what and how much to plant. As late as June and early July, some farmers were switching from grains to cotton and making every effort to plant additional soybeans. These last minute adjustments were possible only because of the new freedom provided by the Agricultural Act of 1970.

Easing the Surplus Corn Situation

The Department took various steps to ease problems caused by the record corn crop. Heavy participation in the set-aside program by farmers made approximately 4.7 billion bushels of corn eligible for loan compared with only 2.1 billion bushels from the large crop 2 years before. This, combined with the drawdown in grain and soybean stocks on farms and elevators, permitted heavy loan activity. The farm facility loan program, liberalized in 1971, has helped farmers acquire nearly 600 million bushels of additional grain storage capacity in the past 3 years. This increased capacity enabled farmers more readily to take advantage of loan programs.

The sale of CCC storage bins to farmers added 16,000 structures and almost 68 million bushels of capacity to onfarm storage. And to further encourage farmers to plan an orderly marketing program for the large corn crop, the Department announced reseal of 1969, 1970, and 1971 crop corn until May 31, 1973. These actions strengthen market prices by reducing the free supply of 1971 crop corn available. The Department also announced in December that it would buy corn in the grain market to help strengthen corn prices.

Finally, the Department provided a feed grain program in 1972 that permits farmers to take 20 million more crop acres out of production than were diverted in 1971. This will help increase farm income by increasing program payments and by bolstering feed grain prices.

The west coast dock strike, followed by strikes at east and gulf coast ports, caused serious problems to farmers who had produced a record harvest for national and world markets. Farm products worth hundreds of millions of dollars, which would have moved through the coastal and gulf ports, could not be delivered. A substantial proportion of these crops were perishable products such as fresh fruits and vegetables, and much of this business was lost. Wheat that normally would have moved to our leading single country customer, Japan, piled up in elevators and some of it spoiled. Perhaps even more serious, the Japanese and other foreign customers made arrangements to buy from our competitors in other countries.

OTHER PROGRAMS

The Department carries out many activities in addition to the commodity programs in behalf of America's family farms. Some are designed to make production and marketing more efficient, thus reducing costs and increasing farmers' income; other add to bargaining power, or "economic muscle," of agricultural producers in market competition; still others protect producers against unfair competition or gouging; and some help farmers and ranchers survive the ravages of natural disasters. All these programs are essential in maintaining and strengthening our family farms.

Market News—Marketing System Foundation

An accurate, timely, and trustworthy system for collecting and disseminating information on the supply, demand, and prices of agricultural commodities is a vital ingredient of an efficient marketing system.

The Federal-State Market News Service provides that ingredient. Approximately 375 USDA and State market reporters, operating from some 200 offices across the Nation, collect up-to-the-minute information on the marketing of nearly 300 agricultural commodities. A 22,000-mile teletype network maintained by USDA's Consumer and Marketing Service (now the Agricultural Marketing Service) links these offices together for instant communication.

In fiscal 1971, more than 345,000 individual market reports were prepared and millions of copies were distributed and reprinted or broadcast daily, weekly, and monthly by newspapers, trade journals, and radio and television stations.

> A cattle feeder in Amarillo wanting to know the national supply situation, checks the Weekly National Slaughter Cattle Summary, begun in 1970 at the request of cattle feeders. Before this report became available, cattle feeders' knowledge of supplies and prices of slaughter cattle was limited to their own area. Knowing the national marketing pattern not only enables them to bargain more effectively, but also helps them plan future operations.
>
> Members of a nationwide egg producers cooperative requested changes in the methods of reporting egg prices. The Market News Service publicized their request, held public meetings, and made a thorough study of the reporting system in the light of 1,100 written comments. A modified method of reporting prices now enables producers to calculate more accurately what they can expect to get for eggs.

Dissemination of market news has been modernized to take advantage of the new electronic techniques in communication. Use of automatic telephone answering devices more than doubled in fiscal 1971, with 73 in operation at the end of the year. Telephone tape recorders in localities remote from market news offices enable producers inside and outside the local area to receive the very latest market information around the clock.

> During the potato marketing season, the CMS fruit and vegetable terminal market reporter in Philadelphia makes daily recordings for Delaware potato producers. By dialing a prearranged number in Dover, Del., producers throughout the State learned the latest market trends.

Marketing Agreements and Orders

In any marketing system where supply and demand cannot be greatly influenced by the individual producer, additional tools may be needed to ensure orderly marketing. Through marketing agreements and orders farmers join together to solve industrywide marketing problems. Milk, fruits, vegetables, and nuts are the chief commodities for which marketing orders are operated.

Forty-nine marketing agreements and orders were in effect on June 30, 1971, for fruits, vegetables, and related specialty crops including tree nuts and hops, covering some $2 billion in farm value—about the same as a year earlier. New programs covering Florida interior oranges, red tart cherries, and Hawaiian papayas were initiated.

The Nation's dairy farmers in 1971 marketed 7.9 billion gallons of milk under Federal milk marketing orders, or about 60 percent of all the milk marketed in the United States. These orders, which set a minimum farm price for milk, helped producers obtain an average price of $6.21 per hundredweight, 12 cents more than in 1970. In the Puget Sound and Georgia order markets, Class I base plans authorized under the Agricultural Act of 1970 became effective. The middle Atlantic milk order adopted a dairy promotion and research program financed by deductions from producers as authorized by a 1971 amendment to the Agricultural Marketing Agreement Act.

Market Research and Promotion

Research and promotion orders are designed to help producers expand markets for their commodity and its products. The funds collected may also support research on insect, disease, and weed control, and on quality improvement, mechanization, processing, marketing, and development of improved products.

Under provisions of the Cotton Research and Promotion Order, cotton producers budgeted nearly $10 million in calendar year 1971, divided about equally between research and promotion. This was a change from prior years, when about two-thirds went for promotion. A comprehensive management study completed in fiscal 1970 showed a need for increased research on production and marketing costs and product development. Research and promotion activities are financed with $1 per bale producer assessments collected under authority of the Cotton Research and Promotion Act.

The 1971 program emphasized work with textile mills and manufacturers to coordinate market development and technical research. A major effort was also launched to increase demand for cotton goods by stressing cooperative manufacturer-retail advertising. The bulk of the research fund is earmarked for product development and improvement, and for projects aimed at cutting farm-level costs.

In fiscal 1971, the Secretary approved the use of an additional $10 million—from Commodity Credit Corporation funds—for cotton research and promotion as provided under the Agricultural Act of 1971.

Two additional significant developments were passage of "omnibus marketing" legislation and the Wheat Research and Promotion Act. The first measure authorizes: (1) Sales promotion, education, and research programs for milk and its products; (2) a potato research and promotion program; (3) a tomato advertising program; and (4) setting of import restrictions on raisins, prunes, and olives.

The Wheat Research and Promotion Act authorizes the Secretary to enter into agreements with agricultural organizations to carry on research and promotion for expanding domestic and foreign markets. The Department signed an agreement in July 1971 with the National Wheat Institute for the expenditure of about $2 million.

Statistics for Farmers

Facts on production, supplies, and price of agricultural commodities are essential for producers if they are to make wise decisions.

Our Statistical Reporting Service monitors the progress of the Nation's crops and livestock, agricultural prices, and farm labor, and communicates the results in some 600 statistical reports issued from Washington and 10,200 reports issued through 44 field offices serving the 50 States.

Uncertainties hung heavily over farmers, livestock and poultry feeders, processors, and processors and program administrators long before the 1971 crop season was underway. Farm production in 1970 had been the lowest in two seasons, mostly because Southern corn leaf blight and dry weather slashed corn output.

Corn for grain was harvested from about 57 million acres in 1970, but yields were only 72 bushels per acre, compared with 84 in 1969, and total production tumbled 10 percent to 4.1 billion bushels.

Because of the sensitive market situation in 1971, the reports of the Statistical Reporting Service during the growing season were followed closely by growers, livestock producers, the marketing system and consumers.

The first clue to 1971 prospects was provided by a special survey of farmers in 35 major producing States for an indication of 1971 planting intentions. The report, issued on January 25, reflected farmers' plans as of January 1. Growers in States producing about 98 percent of the U.S. corn crop said they would plant 6 percent more acres of corn for all purposes than they had done in the preceding year.

The regular March Planting Intentions Report substantiated the January estimate, indicating that producers in the 35 States had changed their plans very little. The first acreage survey to estimate actual plantings, made in June, indicated that farmers planted 74.7 million acres of corn, an 11-percent gain from 1970. Acreage for grain harvest amounted to 64½ million, a 12-percent increase.

The monthly production forecasts beginning in August and continuing through harvest are based on a current estimate of acres to be harvested for grain and predicted yield computed from monthly reports by farmers, and observations and measurements of plants and ears of corn in scientifically selected cornfields.

> The threat of the corn blight prompted an experimental project employing special sensing and photographic equipment. Cameras and multispectral scanners were used on high and low flying aircraft of the National Aeronautics and Space Administration and the University of Michigan.
>
> This project, in which Purdue University also cooperated, included flights over 210 test sites in Ohio, Illinois, Indiana, Missouri, Iowa, Minnesota, and Nebraska. Each test site was about 1 mile wide by 8 miles long. Thirteen other sites were studied in Michigan. Researchers monitored development and spread of corn blight at 2-week intervals from June through September.

In contrast to 1970, the condition of the corn crop generally improved during the 1971 growing season and blight did not reach the epidemic proportions of the year before. The 1971 final estimate of 5.5 billion bushels was within about 4 percent of the first production forecast made in August.

The average change between the August and final estimates in the 10 preceding years was about 5 percent. Information made available by the crop forecasting program helped provide stability and prevented speculative swings in prices that would have handicapped producers and buyers alike.

IMPROVING FARM MANAGEMENT

As capital investment, operating costs, and management requirements for successful farming grow, programs to help farmers increase the efficiency with which they use their resources become more important. The Cooperative Extension Service carries the primary responsibility for helping agricultural producers adapt new research developments and techniques to individual farming situations.

Farm Management

All the major agricultural States have strong Extension programs in farm management. Nearly all States offer farmers a computerized record-keeping service and many provide computer programs to help farmers evaluate the profit possibilities of alternative courses of farm operation.

The Virginia Cooperative Extension Service under an Extension Service-USDA contract began phase II of a pilot project to demonstrate how remote terminals in county agents' offices can help farmers make wise management decisions. Phase II calls for broader field testing and training of Extension agents in using remote computer terminals and computer programs. One management program helps farmers evaluate alternatives for capital investment.

> A Virginia operator of a 100-cow grade A dairy who, over the past 10 years, has mechanized his operation so that his family supplies virtually all of the labor remarked, "I sure wish I'd had this kind of help during the mechanization of my dairy." He had just seen the investment program demonstrated.

The Missouri Extension Service offers a computer short course to assist hog producers in figuring least-cost rations.

> "I believe this was the most informative Extension course I have ever attended," a Pettis County farmer said.

In Arkansas farmers are exploring the production of corn silage and high moisture sorghum in rotation with soybeans and cotton. To help them use this new supply of feed, the Cooperative Extension Service designed a land use program which includes confinement feedlots for cattle.

> "I have increased my net income $20 per acre by producing corn and sorghum for marketing through cattle," reported a farmer in Jackson County.

Nearly all State Extension Services include tax management in their farm management programs and 20 conduct tax schools in cooperation with the Internal Revenue Service and State departments of revenue. More than 13,000 practitioners who participated in the schools reported preparing 800,000 tax returns for farmers.

Industrywide Commodity Programs

Such commodity groups as the beef, sheep, cotton, and soybean industries are turning to industrywide programs to make farming more profitable.

A joint study by the Cooperative Extension Services and the National Cotton Council indicates that more effective application of present technology could cut cotton production costs 5 cents per pound.

> About 200 farmers in leading cotton producing States were selected to carry out demonstrations. Land preparation costs on 10 demonstration farms in Arkansas were reduced by from $3.50 to $8 an acre with the use of minimum seedbed preparation techniques. In Arizona land preparation costs were reduced by $10 an acre.
>
> Planting cotton in narrow rows and closer together on nearly 30,000 acres on the demonstration farms produced an additional $20 to $36 per acre.

In cooperation with the National Pork Producers Council, Extension continued its review of eight critical areas of swine production, completing booklets for each of the eight areas and fact sheets summarizing the published studies. Approximately 2 million copies of the fact sheets were distributed.

Organization of the National Soybean Industry Resource Committee was completed for the purpose of improving communications among the various facets of the industry, researchers, and Extension personnel.

Through educational marketing programs, Extension works with producers and producer groups of nearly all major commodities to make marketing more competitive and effective.

> Extension workers helped producers in North Carolina, Virginia, and West Virginia analyze their marketing situation. The producers organized a cooperative which marketed 19,000 lambs in 1971, increasing returns by about $1.20 per head.
>
> In Arizona, Extension helped increase proceeds from the Hopi (Indian) Agricultural Improvement Association livestock sale. Losses caused by shrinkage were reduced by from $3 to $5 a head, consignments increased from 500 to 800 head, and out-of-State buyers are now attending the auction. A buyer from Dodge City, Kans., who bought 278 animals commented, "This sale is really improving with faster and more efficient service to the Hopi cattlemen and cattle buyers."

Work With Low-Income Farmers

About 20 percent of Extension resources devoted to agricultural production and marketing work is allocated to programs serving low-income farmers.

The Texas "Intensified Farm Planning Program" is a pilot project involving 400 small and low-income farmers in 10 counties selected to receive special intensive help.

> Forty-two low-income farmer participants in two counties included vegetable production in their farm programs. They added $20,500 to their collective incomes through this one enterprise.
>
> Thirty-two farmers in Freestone County began a spray program to control cattle flies, 20 planted vegetable gardens for the first time, 8 built new homes, and 6 remodeled existing homes.

The Missouri Extension Service carries out a "Small Farm Development Program" which is designed to produce an educational model for low-income farmers.

> A survey in Wayne County showed that 70 percent of 411 farmers interviewed wished to make changes in their farming operation in the next 3 to 5 years and 69 percent wanted to expand their operations.

Youth in Agriculture

Working through youth enrolled in 4-H Clubs is still a major and effective way of teaching practices that help to increase farm income. During the year, 4-H members completed well over 2 million projects related to farm income. These included more than a million animal science projects and over 360,000 plant science projects. Among other projects completed were some 350,000 in conservation, soil and water, wildlife and forestry; 190,000 in tractor, small engines, and the automotive category; 120,000 in electricity; and more than 100,000 in woodworking and other shop practices.

> The West Virginia heifer replacement project is typical of the many kinds of projects conducted by 4-H members. During 1971 the 27 members participating sold their heifers for an average price of $638, with a top price of $1,000.
>
> Members buy the animals as calves, grow them out for 2 years and breed them for calves as near the auction date as possible. The project is designed specifically for those members who are not equipped to handle animal herds of economical size. It provides participants an economic return, a 2-year learning experience, and gives commercial dairymen a source of high quality replacements for their dairy herds.

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> An Alabama 4-H member harvested 5,648 pounds of peanuts per acre from his 6-acre crop. Top yield in the adult peanut yield contest in Alabama was 4,644 pounds. In Georgia the top yield in the adult contest was 5,299 pounds.

AID IN FARM EMERGENCIES

Special aid programs help farmers survive the effects of such natural disasters as droughts, floods, hurricanes, tornadoes, and earthquakes.

Federal Crop Insurance

The agricultural economy was strengthened in 1971 through voluntary Federal Crop Insurance on nearly a billion dollars of crop investments. The financial and credit positions of insured farmers were stabilized by this protection which indemnifies them for crop catastrophies. The benefits are illustrated by an Arkansas cotton grower who was able to harvest a profitable 1971 crop only because his 1970 indemnity check kept him in business.

Federal Crop Insurance was available to farmers in 1971 in 1,422 counties on one or more of the 22 crops insured. Farmers paid $48 million for the protection. Total insured losses were about $30 million. The high production costs of modern farming bring the value of all-risk crop insurance of annual crop investments into sharper focus each year. Farmers and their credit sources recognize how quickly crop failures at today's production costs can put a farmer out of business. A major reorganization of the FCI administrative pattern, designed to provide insured farmers more and better service, was completed during the year.

Emergency Assistance Programs

Programs administered by the Agricultural Stabilization and Conservation Service also help farmers who are hit by natural disasters.

Operators of 35,000 farms in areas of 23 States received permission in 1971 to harvest hay, or to graze animals, on 588,000 acres of land withheld from crops under set-aside programs, foregoing $1,866,405 in payments.

Under a new provision, hay was harvested from 25,000 acres on 1,869 farms and stored for use only in case of future emergency.

To relieve the feed problems caused by extreme drought in southwest States, 9.2 million bushels of CCC-owned feed grain were sold at reduced prices to eligible livestock producers. In three of the States, ASCS handled a hay transportation assistance program authorized and reimbursed by the Office of Emergency Preparedness, moving in 142,318 tons of hay to help 4,256 livestock farmers.

ASCS shares with farmers up to 80 percent of the cost of rehabilitating farmlands damaged by natural disasters or of carrying out emergency wind control measures under the Emergency Conservation Program. Under the 1971 program, 335 counties in 24 States were designated as disaster areas. A total of $18,862,184 was allocated to these States for use in the designated counties. Typical measures approved include the removal of debris, grading and shaping to restore farmland, and reestablishing permanent vegetative cover.

To assist needy Indians in distress in 28 tribes in Arizona, New Mexico, Utah, and Colorado, CCC donated over 42 million pounds of feed grain distributed by the Bureau of Indian Affairs.

Emergency Loans

During calendar year 1971, the Farmers Home Administration advanced a record $130 million in disaster relief loans to restore operations on 19,486 farms. Eligible farmers may now receive disaster loans even when other credit resources are available. In certain cases, interest and principal payments may be deferred for the first 3 years of the loan. If the President declares a major disaster, a forgiveness authority is invoked, cancelling a portion of the principal of loans made to replace loss or repair damage. Refinancing of existing liens against destroyed structures and equipment is permitted when the applicant has reasonable repayment prospects and the loan is needed to retain the property.

"POLICING" THE MARKET

Another area of USDA service in behalf of agricultural producers is found in the regulatory programs which provide "rules of the road" for the agricultural market system. Without such regulation, the market could become as chaotic as a community without police—a fact which, fortunately, is recognized by farmers, marketers, and consumers alike.

Commodity Exchange Authority

Producers and consumers look to the Commodity Exchange Authority to safeguard competitive pricing of wheat, corn, soybeans, cotton, and 16 other agricultural commodities on futures markets at Chicago, Minneapolis, Kansas City, and New York. The hedging and price-basing services of the commodity futures markets are widely used by farmers, merchandisers, and processors; they also affect retail prices paid by consumers. The aim of the CEA is to assure open, fair, and competitive trading in futures contracts, to prevent price manipulation, and to protect persons trading in futures markets from cheating, fraud, and other abusive acts and practices.

> In the calendar year 1971, futures trading in 20 agricultural commodities regulated under the Commodity Exchange Act reached a new record of 11.8 million transactions, up 2 percent from the previous record of 11.5 million transactions in 1970. The estimated value of $123 billion in 1971 was 15 percent above the previous year. Trading in soybeans, accounting for one-fourth of the transactions for all regulated commodities, was up about 55 percent. Corn, the second largest market, with trading of 10,400 million bushels, held close to the previous year's level. Cotton trading expanded to almost 36 million bales, more than ten times that of the previous year. The livestock and products markets continued highly active. Trading in frozen concentrated orange juice reached a new record of 157,900 contracts. There is every indication that futures trading activity will continue upward in the coming years.

An Open Market System for Livestock, Poultry, and Meat

The Packers and Stockyards Administration is concerned with maintaining fair and competitive marketing at all levels of the livestock, poultry, and meat industries. Its responsibility covers the operations of some 2,200 public stockyards, 3,000 private buying stations, 3,600 meat packers, 16,000 livestock commission firms and dealers, and 1,000 poultry dealers and processors. The agency attempts to apply just enough regulatory guidance to allow the forces of supply and demand to function effectively.

Livestock and poultry transactions subject to the P&S Act total more than $17 billion annually, or close to one-third of all cash income from marketings for U.S. farmers. More than $22 billion worth of annual sales of meat and dressed poultry are also subject to regulation.

P&SA's several major programs to safeguard the marketing of livestock, poultry, and meat include: (1) Fair, competitive marketing; (2) financial protection; (3) accurate scales and weighing; (4) reasonable rates and services; and (5) reparations. The agency also administers the Truth in Lending Act in respect to those subject to the P&S Act.

The need to eliminate unfair business practices and to establish better business relationships between poultry processors and farmers led P&SA to publish regulations during the year setting out guidelines for the industry.

Proposed guidelines for advertising and promotion within the meat industry were also taken under consideration.

Concern for maintaining effective competition in the veal calf market led P&SA to file a complaint against eight New York meat packers, charging them with manipulating and controlling prices of veal calves, restricting competition, and allocating sales and purchases of veal calf carcasses.

The agency's Financial Protection Program includes requirements for solvency by buyers and agents, custodial trust accounts, bonding, reparations, and prompt payment.

> P&SA actions resulted in registrants adding nearly $10 million in new working capital, $3.9 million more to trust accounts, over $88,500 in reparations awards, and an additional $62 million in bond coverage. Claimants also received more than $190,000 through claims filed on bonds of registrants.

P&SA extended its Weighmaster Training Program into 10 new States, making a total of 3,540 scale owners and weighmasters in 33 States who have attended these training sessions. The program is designed to use formal training as a tool for getting more reliable weighing throughout the livestock and poultry industry.

Other Regulatory Programs

The Perishable Agricultural Commodities Act promotes fair trading in the fruit and vegetable industry. Reparations totaling $1.3 million were awarded to aggrieved parties in formal proceedings in fiscal 1971, while informal settlements resulted in payments totaling another $2.8 million. Proposed amendments to the Act introduced in Congress during the fiscal year would provide that an oral hearing need not be held in a formal reparation proceeding unless the amount claimed as damages exceeds $3,000. By raising the minimum from $1,500, the amendment would reduce the number of oral hearings and expedite the handling of formal reparation complaints.

The Federal Seed Act ensures truth in labeling and advertising of seeds moving in interstate commerce, and prevents the importation of low quality seed into the United States. An unusual activity in 1971 involved the testing of corn seed to determine whether it was truthfully labeled as to resistance to Southern corn leaf blight. This allowed an industry agreement to label corn seed so farmers would know its blight resistance.

> Enforcement of the Federal Seed Act is a Federal-State cooperative effort. During fiscal 1971, 35 States reported 729 possible violations for USDA investigation and action. As a result, 209 citations were issued, compared to 153 the year before; and 40 prosecutions were recommended involving 176 shipments of seed, compared with 31 prosecutions involving 88 shipments in fiscal 1970.

In June, proposed amendments setting new standards for genetic purity of certified seed were published in the Federal Register. These amendments, prepared in cooperation with the Association of Official Seed Certifying Agencies, would standardize certain seed certification requirements.

On December 24, 1970, the Plant Variety Protection Act was enacted to encourage the development of novel varieties of sexually reproduced plants to make them available to the public and to provide developers with patent-like protection. In the 6 months following enactment, the Plant Variety Protection Office operated by the Consumer and Marketing Service received 110 applications for protection involving 32 kinds of agricultural, vegetable, and flower seeds.

The United States Warehouse Act provides for voluntary licensing of warehousing facilities to insure the integrity of receipts issued for stored commodities. These receipts are then used by the industry for trading and loan purposes.

Licensing activity for grain warehouses has continued to increase, reflecting more and larger capacity warehouses, while the number of cotton warehouses has leveled off, however, also with a continuing trend to larger capacity warehouses.

USDA transportation specialists—in an effort to insure reasonable freight rates and services for agricultural commodities—expect to review in excess of 12,000 proposed rate adjustments in 1972, and represent varied agricultural interests in numerous rate proceedings before Federal and State regulatory bodies as well as the courts.

> USDA specialists worked on behalf of North Dakota and Montana grain interests to secure lower railroad freight rates on wheat. Reduced rates become effective December 11, 1972, and will save North Dakota and Montana farmers over $11 million annually.

USDA specialists also joined with shippers of fruits, vegetables, and perishable foodstuffs in opposing a railroad increase in mechanical protective service charges on carload shipments of perishable freight. The Interstate Commerce Commission ordered the railroads to cancel the increase, thus saving perishable shippers an estimated $50 million annually.

BUILDING "ECONOMIC MUSCLE" THROUGH CO-OPS

Cooperatives have long had an important role in helping farmers sell their products for better prices and enabling them to buy supplies and services at lower costs. Consequently, it has been, and remains, the policy of the U. S. Department of Agriculture to assist farmers in forming and managing cooperatives.

Leadership in this area is lodged in the Farmer Cooperative Service with important assists from Extension and FHA.

Farmers, traditionally producers of raw agricultural products, directed greater attention in fiscal 1971 toward developing and merchandising finished food and fiber products for national and international markets.

Their increased activity in this area stems from a growing recognition of the new income opportunities which additional joint action promises to place within their grasp.

Five out of six agricultural producers use cooperative action for securing production inputs and for marketing products. These transactions exeed $19 billion annually.

The trend toward new horizons was exemplified during the year by such developments as the following:

> Three regional cooperatives formed a new marketing cooperative to introduce frozen fried chicken and potato products on the east coast.
>
> A midwestern grain regional cooperative created a foods division to develop and merchandise textured vegetable protein for the meat processing industry.
>
> Fruit growers on the west coast test-marketed prune juice in Germany and snack packs of prunes in Germany and Italy.
>
> Four cotton cooperatives, growing a quarter of the Nation's crop, merged their world sales forces.

That farmers are shifting from a production to a marketing orientation is evident also in the type of assistance sought from FCS. While continuing to look for ways to reduce costs, cooperatives are asking for financing and marketing research and for evaluations of possible benefits through mergers.

An FCS study of the feasibility of combining operations indicates that four fruit processing cooperatives could save up to $7 million annually. Preliminary results of a cotton ginning study underway in California indicate that a reorganization of facilities and improved methods of handling and storing seed cotton could save $8 per bale, or nearly $10 million annually.

An evaluation of manufacturing plants for a midwestern honey cooperative shows that operating costs could be reduced 10 percent or $400,000 annually. This saving could add nearly one cent per pound to the net returns of beekeepers.

Building a soybean processing plant in southwest Missouri could save soybean producers and feed users in Missouri, Arkansas, and Kansas $500,000 annually.

FCS responded to requests for economic research assistance by engaging in 28 research projects and 13 advisory studies during fiscal 1971.

Technical advice, data, and financial assistance were provided to land-grant universities and other institutions to support their research on cooperative problems.

Three major problem areas facing farmer cooperatives include economic integration, bargaining, finance, membership relations, and improving the quality of living for rural people.

> A study of the top 100 cooperatives indicates volume from 1962 to 1970 has risen an average of 17.2 percent. More specific research indicates that 20 of the 25 major regional farm supply cooperatives in 1968-69 realized net savings of $65 million, of which $37 million in cash was returned to members as cash dividends on stock, revolving capital, and patronage refunds.
>
> Cooperatives manufactured about 20.5 percent of the total feed produced in 1969, but refined only 1.8 percent of crude oil processed.
>
> An FCS study found that 105 farmer cooperatives were full-line farm machinery dealers with sales of $36 million and net savings of 1 percent.
>
> Forty-seven fruit and vegetable processing cooperatives handle about one-fifth of all fruit, vegetables, and juice processed in the United States.
>
> Cooperatives now process 24 percent and 15 percent of the total U.S. cottonseed and soybean crush, respectively.

Extension is also directly concerned with making cooperatives more effective vehicles for farmers.

During the year planning went forward on a National Workshop on Cooperatives for Low-Income People to be held early in 1972. Extension conducted four regional "listening sessions," with representatives from marketing, supply, housing, credit, insurance, and consumer cooperatives, to permit the co-ops to express their educational needs and suggest ways of meeting them. Meetings were held also with cooperative leaders individually. The major concerns expressed included finances, joint ventures, vertical integration, and other vehicles to improve the competitive position of farmers.

An Extension-sponsored pilot project on "Information Systems for Decision Making by Cooperative Directors and Managers" was completed, along with plans for holding a national workshop to assist State Extension staffs in implementing the results of the pilot project. Considerable effort was also devoted to assisting a number of cooperatives to adapt the materials developed in the pilot project on cooperative communications completed last year at the University of Wisconsin.

Looking to the future, FCS is studying the scope and status of cooperative bargaining in the United States as well as evaluating how cooperatives can expand foreign trade in the 1970's.

Particular emphasis is being placed on determining marketing potentials for grain, cotton, fruit, and vegetable cooperatives.

Formulas for predicting managerial and cooperative success are being developed. Member attitudes toward cooperatives will be analyzed to develop more effective member relations programs.

A new dimension in cooperative education is underway. The American Institute of Cooperation has requested FCS assistance in developing a 6-hour college-level teaching unit on farmer cooperatives for insertion in general economics or business courses.

Studies of business operating practices will include fertilizer pricing, trends in feed manufacturing and distribution, cooperative pricing and pooling systems, financial structure, improved business methods, and reduced transportation and distribution costs.

Research is underway to determine the possibilities of coordinating inter-cooperative rail and barge transportation of grain and bulk farm supplies among 14 midwestern regional grain marketing and farm supplies cooperatives. Preliminary findings indicate a savings potential of $1 million a year in reduced transportation costs.

Cooperative development leadership is being extended to existing cooperatives and to groups wanting to form new cooperatives. These range from livestock producers' associations to handicraft cooperatives; from petroleum and farm machinery cooperatives to catfish and seafood processing cooperatives. One project calls for continued technical assistance after the formation of a sheep shearers' cooperative.

> Long-range cooperative assistance is committed to the Navajo Nation, embarked upon an irrigation project to convert 111,000 acres of desert land to productive use. Three marketing cooperatives have been organized so far through the efforts of FCS, the Four Corners Regional Commission, Colorado State University and the Navajo Tribal Council. The cooperatives will be charged with marketing the crops and livestock expected when the irrigation project begins in 1975.

THE ROLE OF CREDIT

Agriculture in the United States is clearly characterized by a sharply growing dependence on credit financing.

Many Americans who wish to expand or go into farming and who are unable to qualify for ordinary commercial credit, obtain the financing they need from the Farmers Home Administration. FHA financing has helped many thousands of American agricultural producers to get a start on the land and has helped additional thousands become truly successful farm operators. With its predecessor, the Farm Security Administration, FHA has made some 2,300,000 farm ownership and operating loans since the mid-1930's. Over 200,000 active farm loans were on the books at the end of 1971.

Many FHA borrowers ultimately "graduate" from FHA to credit from banks and other conventional lenders, the Farm Credit Systems, and suppliers.

During the calendar year, Farmers Home advanced $754 million in loans to strengthen and maintain family farms. This included $287 million in farm operating credit to 41,330 families (185,900 persons); farm ownership loans totaling $317 million to 12,404 borrowers (55,800 persons); $130 million in disaster relief loans to restore operations on 19,486 farms (87,600 persons). Loans for other farm services included $20 million for livestock grazing associations, soil and water improvements, and other nonfarm enterprises.

> The progress that can be achieved with the help of FHA credit is illustrated by the Gerrit Boerema family of North Carolina, chosen by a panel of judges after a year-long competition as the Nation's most outstanding FHA farm family.
>
> Natives of Holland who came to the United States shortly after their marriage in 1949, Mr. and Mrs. Boerema worked on dairy farms in Missouri and Minnesota before moving to North Carolina in 1957.
>
> Starting with rented land and seven cows 14 years ago, the Boeremas turned unproductive marshland into an outstanding modern dairy farm. Today they own 176 acres, have 110 cows, a large milking parlor, hay and calf barns, fully automatic feeding equipment, and every other facet of a successful operation.
>
> Since 1961, the Boeremas have obtained FHA farm ownership loans totaling $44,810, short-term credit totaling $40,880, and a rural housing loan of $17,000. They have a flawless record of meeting obligations on these loans. Fusing this credit with their outstanding management ability, the Boeremas have increased their net worth by 500 percent in little more than a decade, from $15,000 in 1959 to more than $75,000 today.

Three changes in policies and procedures during the year improved FHA's ability to assist family farmers: Limits on farm ownership loans were raised, emergency loan provisions were liberalized, and a policy of simultaneous farm ownership loans with commercial lenders was initiated.

Farmers Home credit can now be extended to farmers whose real estate debt is as much as $100,000, in contrast to the 10-year-old maximum limit of $60,000 that has been outmoded by increases in land values, farm sizes, and mechanization. The new ceiling increases the amount FHA may lend to a farmer to buy, enlarge, or improve a farm, and it also raises the maximum amount of credit for one farmer which FHA may share with other lenders.

Farmers Home can and does subordinate its mortgagers to private individuals, banks, and other commercial lenders, or Federal Land Banks when the other lender's loans are for authorized FHA loan purposes. The new $100,000 total debt limit will help many young farmers and others, who cannot get sufficient credit from any one lender, to finance their needs from combinations of lenders, including FHA.

By encouraging commercial lenders to participate with Farmers Home, about $100 million in private funds was brought into rural areas under the operating loan program in fiscal 1971. Policy changes permitted the use of subordinated loans in the farm ownership loan program during the last few months of fiscal year 1971 and another $7.5 million of private funds was made available to FHA borrowers. Because of the higher outlays required for purchase of farms, it is anticipated that more than $250 million of private funds will be added to the farm ownership program during fiscal 1972, while the infusion of funds in the farm operating program is expected to approximate $150 million.

As part of its program to help younger people begin farming, FHA recently started making "young loans."

> One such loan—for $1,000—went to a 14-year-old Bennington, Okla., youth. "I'm going to buy some cattle," he said. He hopes to become a FFA Junior Master farmer. The boy's father wholeheartedly favors his son getting an early start in ranching. "It takes a long time," the father said, "You can't just jump in there and buy all that cattle, land, and equipment. And it's higher today than it ever was."
>
> Mark plans to start his herd with about 5 head, hoping to expand it as time and profit allow. He also plans to pick up some prize ribbons at county fairs and other shows.

FHA expects to make a host of "young loans" across the country, stimulating youth's interest in farming and ranching and giving youngsters a better chance to stay on the farm if they are inclined to. The loan goes to the young man, but FHA requires that the applicant's parents be eligible for loans before money is advanced to the son.

AGRICULTURE AND FOREIGN AFFAIRS

"The ability of the United States to hold its own in world competition depends . . . on the competitiveness of our economy."

Among the outstanding economic achievements of 1971 was the remarkable upsurge in U.S. agricultural exports, which reached an unprecedented level of $7.8 billion during the 12 months ended June 30, 1971. This was a gain of $1.1 billion, 16 percent more than in fiscal 1970, and it set alltime records for export volume, value, and commercial sales for dollars.

Dollar sales alone totaled $6.7 billion, about equal to the combined dollar and concessional exports in the previous record year of fiscal 1967. Agricultural trade in fiscal 1971 provided a net contribution of almost $1 billion to the Nation's balance of payments.

For the calendar year exports totaled $7.7 billion, a calendar year record. They would have been even higher but for the dock strikes.

On the farm the export record meant that one dollar of every $7 of cash receipts came from foreign markets; one in nearly every four harvested cropland acres produced for export; every second bushel of wheat that poured into combine hoppers across the Great Plains was shipped overseas; every other bushel of soybeans was destined for a foreign market as beans, meal, or oil; and more than half the rice from the fields of the South and West moved into international trade.

In addition, over two-fifths of the cattle hides and tallow, and more than one-third of the tobacco and cotton produced by American agriculture went to foreign destinations.

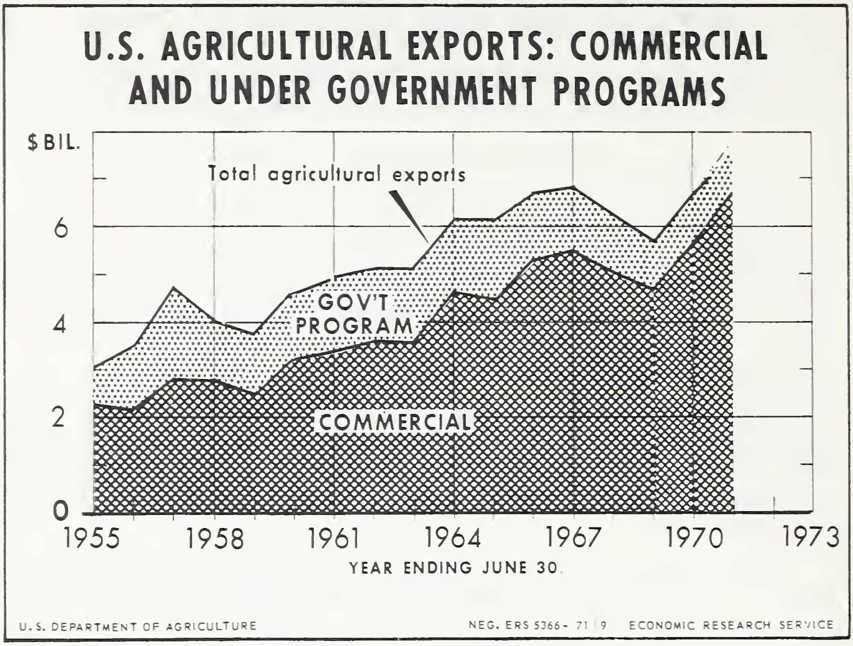
As in recent years, the principal markets were the European Community, which took $1.8 billion worth of U.S. agricultural products, and Japan, the largest single-country customer, where exports exceeded $1.2 billion in the fiscal year but dropped to $1.1 billion for the calendar year.

Soybeans and their products continued as the leading export commodity with shipments totaling $1.9 billion, a gain of 24 percent from the previous year. Calendar year shipments were $1.97 billion.

Wheat and flour exports were up 28 percent, to $1.2 billion ($1.09 billion for the calendar year), and feed grain shipments were up 11 percent to $1.09 billion, ($971 million calendar).

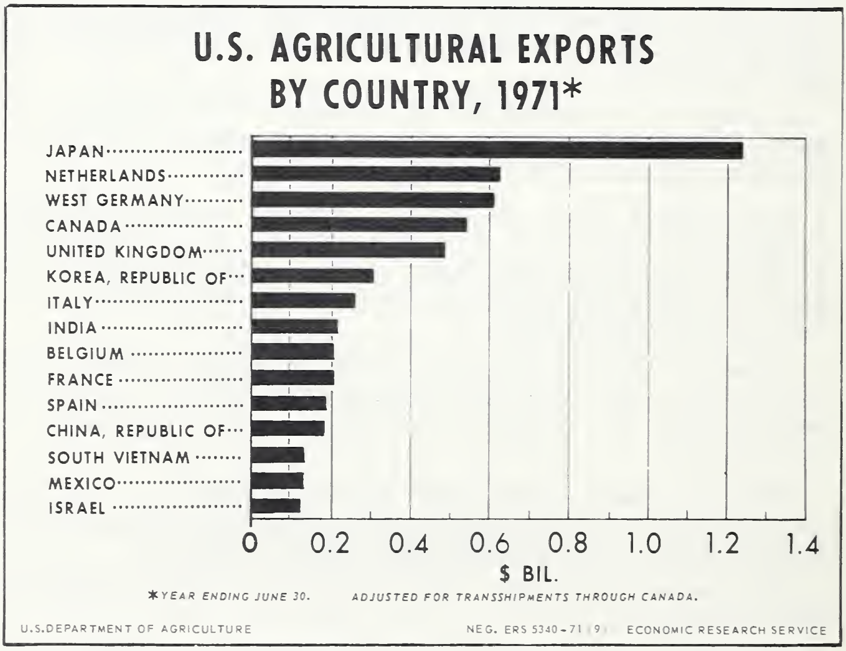
These three commodities account for over 50 percent of all U.S. farm exports.

The value of cotton exports was up 42 percent to $492 million, ($584 million calendar year). Tobacco gained slightly, rising to



U.S. AGRICULTURAL EXPORTS: COMMERCIAL AND UNDER GOVERNMENT PROGRAMS

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 5366- 71 (9) ECONOMIC RESEARCH SERVICE

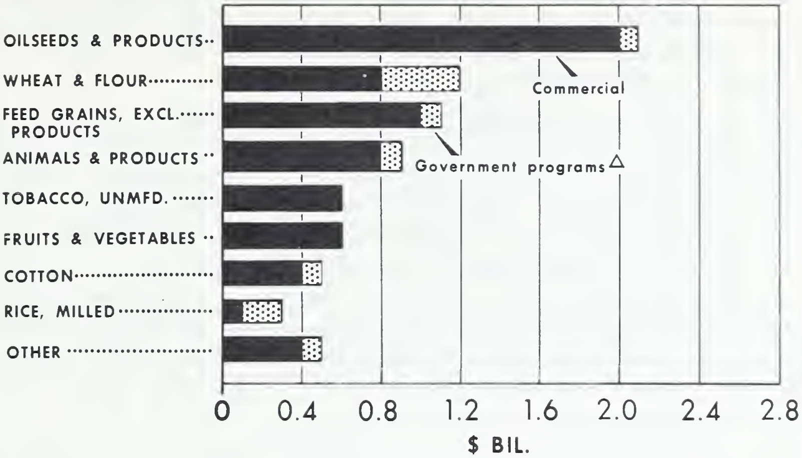


U.S. AGRICULTURAL EXPORTS BY COUNTRY, 1971*

*YEAR ENDING JUNE 30. ADJUSTED FOR TRANSSHIPMENTS THROUGH CANADA.

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 5340- 71 (9) ECONOMIC RESEARCH SERVICE

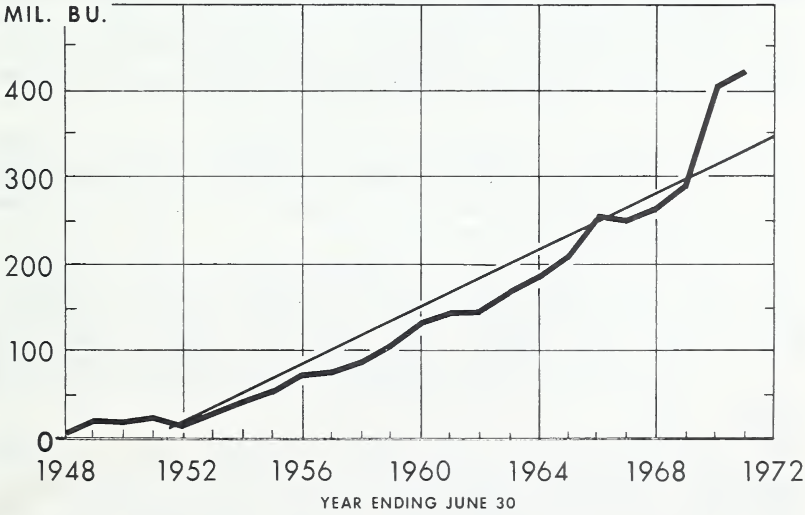
U.S. AGRICULTURAL EXPORTS, BY COMMODITY GROUP, 1971*



*YEAR ENDING JUNE 30. △GOVERNMENT-FINANCED PROGRAMS, P.L. 83-480 AND P.L. 87-195.

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 8484-71 (9) ECONOMIC RESEARCH SERVICE

TREND OF U.S. SOYBEAN EXPORTS, 1948-71



U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 5913-72 (3) ECONOMIC RESEARCH SERVICE

$570 million ($497 million calendar), and exports of animals and products, including dairy and poultry, went up 18 percent to $903 million, ($955 million calendar).

Only rice and hides and skins of the principal commodities showed declines for the fiscal year. Rice was down 10 percent to $289 million and hides and skins, excluding fur skins, declined by 11 percent to $174 million.

Larger volume contributed about half of the increased value of farm exports, with higher prices providing the rest of the gain. Volume increases in soybeans and products, wheat, cotton, inedible tallow, nuts, slaughter cattle, and dairy products shipped under government programs were especially important. On the price side, only rice had a lower average export unit price than the year before.

Among the principal factors contributing to the dramatic gain in U.S. agricultural exports was a reduction in the 1970 grain harvest and stocks in the European Community. Total EC grain supplies were down by 7.4 million tons, and U.S. shipments moved in to help fill the gap.

Also important has been the continued expansion of livestock industries in the principal developed nations. An increasing demand for livestock products has resulted from gains in per capita consumer income.

In the EC as a whole, production of pork, beef, and veal was estimated to be 8 percent larger in 1971 than a year earlier; and in Japan, the numbers of cattle, hogs, laying hens, and broilers have all risen substantially during the past 3 years.

The overall growth in our agricultural exports occurred despite some slowdown in the industrial and economic activities in these major markets. In the EC, industrial production rose only about 4 percent in 1971 (compared with 6 percent in 1970), and in Japan, about 6 percent (compared with 16 percent in 1970).

Exports including transshipments to Eastern Europe and the Soviet Union also increased by over $45 million above the $133 million of fiscal 1970, mostly from larger shipments of grains and of oilseeds and products.

The developing countries, too, bought more agricultural products from the United States. Shipments to these countries—mainly to Korea, Taiwan, and Mexico—were about 14 percent larger than those of a year earlier. Most importantly, this expansion was all in sales for dollars, as exports under government programs were down slightly.

Of our $7.8 billion of agricultural exports, the two USDA commercial programs—barter and CCC export credit—accounted for $1.2 billion, or 15 percent. The P.L. 480 program, under which commodities are sold for foreign currency, on long-term credit, or donated for emergency or charitable use abroad, accounted for exports of approximately $1.0 billion, about the same as a year earlier.

EXPORT SALES AND PAYMENT PROGRAMS

CCC Export Credit Sales Program

To help meet competition from other exporting nations, the Department makes short-term (maximum 3-year) credit available for specified commodities under the CCC Export Credit Sales Program. Credit is extended to private U.S. exporters, who in turn pass it on to foreign buyers. Exports under this program in fiscal 1971 totaled $390.8 million, a record high.

Credit was extended in 38 countries, with South Korea, the United Kingdom, Romania, the Philippines, and Yugoslavia the leading importers under the program. Several countries use short-term credit to purchase the usual marketings required of them as a condition for obtaining P.L. 480 purchase terms. The program has also proved a useful tool in building markets in several East European countries which have been made ineligible for P.L. 480 by legislation.

Wheat exports of $125 million, almost triple the level of the preceding year, topped all commodities sold under the program. Next in order followed tobacco, $76.6 million; cotton, $58.6 million; soybean oil, $32.1 million; corn, $27.2 million; and rice, $26.4 million.

The Barter Program

Exports under the Barter Program reached a new high of $807 million, 73 percent more than in fiscal 1970. Under barter, agricultural commodities are exported in exchange for needed overseas supplies procured for U.S. Government agencies, chiefly the Department of Defense.

Taiwan, the major barter market in fiscal 1971, took commodities valued at nearly $75 million. Other leading recipients were Japan, the United Kingdom, Korea, Yugoslavia, West Germany, Portugal, and Brazil. Cotton exports under the program topped $216 million, the largest for any commodity. In late 1971, however, the Department made most of the principal U.S. cotton customers ineligible for barter because of the reduced U.S. crop and our smaller prospective exportable supply. Tobacco, wheat, and feed grains were other leading barter export commodities.

The Barter and CCC Credit programs were brought together administratively during the year under a reorganization of the Export Marketing Service. Administration of the two commercial export programs was combined under the direction of a newly established office—Assistant Sales Manager for Commercial Credit and Barter.

Public Law 480

Sales and donations under Public Law 480 in fiscal year 1971 accounted for approximately 14 percent of U.S. agricultural exports, in contrast with as much as a third in earlier years. The program was especially important for soybean oil, rice, wheat and flour, and cotton. Almost all of our nonfat dry milk exports were shipped under P.L. 480.

Donations to meet emergencies, support economic development, and combat malnutrition accounted for $280 million worth of commodities in fiscal year 1971, compared with $241 million in fiscal 1970. A total of 76 million people were benefited, over 47 million of them children, in 85 countries. Special efforts were devoted to meeting food needs that resulted from civil strife in Pakistan and the movement of some 9 million refugees from East Pakistan into India.

Export Sales from CCC Inventory

A highlight of the export year was the first grain sale to the USSR since 1964. This was made possible when the Department sold 1.2 million metric tons of government-owned barley and oats to two U.S. grain companies at world prices on condition that they would export to the USSR one ton of U.S. corn or grain sorghum from the U.S. free market for each ton of barley or oats sold to the two companies.

This transaction has many advantages for U.S. farmers, business firms, and taxpayers. These include:

1. Opening up a new cash market for U.S. feed grain exports at a time when U.S. production of corn and of total feed grains are at alltime highs.
2. Paving the way for expanded future trade with Russia by removing the previous refusal of the U.S. maritime unions to load grain for the USSR unless it was carried in U.S.-flag vessels.
3. Assuring the export during the 1971-72 corn marketing season of a minimum of nearly 50 million bushels of U.S. corn, which is equal to 10 percent of total U.S. corn exports during 1970-71.
4. Cutting burdensome government inventories of barley and oats, recovering almost $45 million of public funds invested in these commodities, and saving storage costs in excess of $9 million a year.

The Commodity Credit Corporation also took advantage of a shortage of butter in New Zealand and other normal world trade sources to sell substantial quantities of butter for export, principally to the United Kingdom. Between May 1971 and the end of the calendar year approximately 123 million pounds were sold, including a small amount of Canada. The first offerings sold at 50 cents per pound. Prices advanced later to 52½ cents and 54 cents.

Wheat and Rice Export Payment Programs

Export payments were made on most of the wheat and flour exported during fiscal 1971 and on virtually all of the rice. These payments are made to exporters to keep U.S. prices competitive with those of other major nations.

The wheat payment rate for the year averaged 23 cents per bushel. The highest rate offered at any time during the year was 57 cents per bushel for Hard Red Spring wheat from the Pacific Coast. The net total of payments was $140.2 million for wheat and $7.1 million for wheat flour on total wheat and flour exports valued at $1,225 million.

The principal development in the rice export payment program during the year was an increase of 75 cents per hundredweight in August 1971 to maintain U.S. competitiveness in the face of large world supplies and low world prices. This brought the payment rate on long grain rice to $2 per hundredweight on long grain rice and $1.95 on medium and short grain. Export payments during fiscal 1971 totaled $37.6 million on U.S. rice exports of 37 million hundredweight, valued at $289 million. The average payment rate during the year was approximately $1.02 per hundredweight.

OTHER USDA PROGRAMS

In the face of momentous changes occurring in the world trading climate, the Department strengthened its international market activities and stepped up its international negotiating efforts to protect and improve agriculture's overseas trading posture.

Market Development

Our Foreign Agricultural Service conducted a wide range of market development activities, some new and others of proven worth.

A sustained effort, begun in 1970 to provide more export services at State and local levels in order to broaden participation and create wider interest in the export of U.S. agricultural products, resulted in several noteworthy achievements during 1971.

> A four-State export expansion group was organized with Department assistance, comprising the Departments of Agriculture of Maryland, North Carolina, South Carolina, and Virginia. Organized as the Atlantic International Marketing Committee (AIM), this group will work on overseas market development on behalf of the farmers of the region and will provide assistance to exporters and potential exporters in the four States.

The Department had assisted in the formation of a similar 12-State group in the Midwest in 1970, and in 1971 worked closely with the members in organizing and staging their first trade show, held in the U.S. Trade Center in Tokyo during April. Forty-three commercial firms participated, with such good results that they are planning a similar show for 1972.

With the assistance of State departments of agriculture and with inputs by U.S. agricultural attachés who cover about 100 foreign countries, the Department activated a Trade Opportunity Referral System on June 1. The TORS utilizes automatic data processing equipment to match up requests for products by foreign importers with appropriate U.S. suppliers.

As of December 31, 1971, the growing TORS lists contained 5,835 buyers from 30 countries and 1,234 prospective U.S. suppliers from 32 States.

Export Briefs, a report containing a brief summary of important agricultural trade developments and a list of foreign trade leads, is mailed weekly to State departments of agriculture, market development cooperators, and interested traders not reached by the TORS.

In its food exhibits overseas, the Department is giving increasing attention to institutional buyers—hotels, restaurants, caterers, government facilities and industrial kitchens whose enterprise is volume feeding.

Strides were taken to penetrate the growing institutional market in the Far East last spring with U.S. solo food shows in Hong Kong and Singapore.

> Eighty-three U.S. firms participated in Hong Kong, and sales of beef, poultry, and rice totaling $350,000 were reported even though the principal objective of the exhibitors was trade contacts rather than sales. In addition, the British Army Ordnance Group, stationed in Hong Kong, placed its first commercial order for bulgur after testing samples provided during the show.
>
> Fifty-two U.S. companies had products in the Singapore event, where three importer agreements were signed. Local importers estimate the U.S. institutional market in Singapore now has a potential of more than $1 million yearly.

A series of three institutional events was held during November in Curacao, Jamaica, and Barbados in the Caribbean. Institutional foods were among those stressed at the U.S. exhibit at the ANUGA food fair in Cologne, Germany, a biennial international event that draws buyers from scores of countries.

The more than 90 U.S. exhibitors at Cologne reported well over $1 million in sales and the signing of eight agency agreements with foreign importers during the fair.

The Department continued to work with U.S. commodity and trade associations in its cooperator program of market development on a commodity basis through jointly financed projects approved by FAS and carried out by the commodity cooperators.

Wheat, feed grains, rice, soybeans, cotton, tobacco, citrus, poultry, and many more commodities are represented in the cooperator program—approximately 40 participating with FAS in continuing overseas projects and some 20 more in periodic, short-term projects.

> Shipments of Florida citrus juice to Europe, for example, reached 14.1 million gallons in fiscal 1971, more than double what they were when the Florida Citrus Commission joined FAS in a continuing European promotion program 4 years earlier.
>
> Almond exports to Japan went up by 53 percent, reaching $2.8 million, under the impact of a new Export Incentive Program in which Department assistance is tied to export gains.

The Rice Council, with Department help, is in its second year of in-store promotions in the United Kingdom. Comparisons show that sales in the participating stores during the 1971 promotion were more than six times greater than the average before the promotion, with prospects that they will hold about 25 percent above average for the suceeding 12 months.

Overcoming Trade Barriers

To take advantage of growing world demand, farmers must have access to foreign markets. This presents an increasingly complex problem.

Primary attention was directed toward the European Community, which is in the process of expanding its membership by the addition of the United Kingdom, Ireland, Denmark, and Norway, a market for more than half a billion dollars in U.S. agricultural exports.

Joining the EC brings these nations under the Common Agricultural Policies of the Community. This agricultural system is based on artificially high domestic farm prices on most commodities, shielded from outside competition by variable import levies to equalize domestic and import prices, and the use of export subsidies to dispose of the surplus domestic production induced by high prices.

The Department continued its efforts to convince the Community that it should lower its farm support prices and has used every opportunity to voice strong opposition to the high variable levies, minimum import prices, and other features of the CAP that are harmful to U.S. agriculture.

We contend, for example, that the buyer's premium feature of the EC tobacco policy violates the General Agreement on Tariffs and Trade (GATT) and impairs trade concessions that the United States obtained from the Community in previous negotiations.

The United States also is preparing to negotiate with the Community regarding the Community's extending its network of preferential trading arrangements to other Western European countries, to various Mediterranean nations, and to a number of British Commonwealth areas. We will negotiate under providions of the GATT to protect U.S. trading interests.

In years past, USDA has been successful in opposing EC moves toward imposing an internal tax on soybeans, which are bound duty-free under the GATT, and it continues alert against other changes in EC policy that could adversely affect exports of soybeans and products to the Community.

As a result, when the EC in 1971 adopted rules for possible escape clause action against imports of oilseeds and products, it left out the concept of "normal price," a device which could have been used to impose a levy against imports.

> The Department reacted vigorously against the EC action in extending preferential treatment to several Mediterranean countries whose citrus products compete with ours in the EC. The Community responded in a limited way by reducing the margin of preference on oranges—a move we did not consider adequate—and we are pursuing this issue in the GATT and also on a bilateral basis.
>
> We gained a seasonal duty reduction on both oranges and grapefruit in negotiations with the Community late in 1971.

Other issues on which we are pressing the EC for solution include minimum import prices on canned fruit, a supplemental duty on the sugar added to canned fruit, and an EC draft regulation fixing the size of containers, which would seriously affect U.S. shipments.

Consultations during the year with the United Kingdom have resulted in a grains agreement preserving U.S. rights based on U.S. duty bindings in the British grain market under the GATT, regardless of Britain's joining the EC.

While trade policy time and efforts have been concentrated on the EC and the rest of Europe, the Department has been active in seeking reduction or elimination of trade barriers elsewhere in the world, particularly in Japan.

During the year, Japan effected Kennedy Round duty reductions ahead of schedule on tallow, baby chicks, raisins, safflower seeds, alfalfa pellets, canned fruit, vegetables and tomato juice, and on whole turkeys. Japan informed us that it plans to remove the remaining duty on soybeans April 1, 1972.

It also reduced duty rates on certain pet food, turkey parts, and almonds to compensate for an increase in the bound rate on chewing gum.

The total number of categories subject to Japanese import quotas has been reduced from 80 to 40 since the beginning of 1971.

Among the agricultural items liberalized were grapefruit, fresh grapes, soybean meal, vegetable oils, peanuts for oil extraction, pork, live cattle, swine and horses; sausages, cereal products such as cake mixes, pasta, prepared breakfast cereals, cookies, biscuits, and crackers; instant potatoes, canned corn, confectionery products, crude peppermint oil, and nonalcoholic beverage bases. At the same time, the Japanese placed higher tariffs on grapefruit (seasonally), and feeder cattle, and a variable levy on pork.

Other agricultural trade barriers that were reduced in 1971:

- Taiwan liberalized import restrictions on several items. The new regulations allowed, among other things, unlimited purchases during 1971 of soybeans, corn, wheat, and barley, and they reduced restrictions on some vegetable and textile fibers, vegetable oils, and forestry products.
- Austria temporarily exempted certain items from its border tax, and extended its temporary tariff reductions to December 31, 1971. Frozen turkeys, beans and lentils, dried prunes, and preserved peaches were affected by the former, and canned citrus and pineapple by the latter.
- Spain reduced its 20-percent import deposit requirement to 10 percent, and lowered the temporary duty rates on chickpeas, dry beans, and lentils, while putting dry beans under a variable levy.
- Italy lowered its high veterinary inspection fees to 10 percent of its previous level on tallow and 50 percent on feeder calves. It also suspended the quarantine restrictions on U.S. grapefruit in 1971.
- Australia dropped its temporary levy on vegetable oils.
- Yugoslavia, although it increased its import surcharge from 2 to 6 percent, relaxed its requirement for import permits on several agricultural commodities.
- New Zealand removed brown rot quarantine restrictions from imports of U.S. apples and pears and announced its intention to buy U.S. fruit. It also removed licensing restrictions on fresh apples, pears, citrus, and grapes.
- Canada suspended its duty on cranberries until March 15, 1972, to compensate the United States for a surtax on strawberry imports in 1971.

While working to improve export opportunities abroad, the Department also maintains a watch on foreign imports into the United States competitive farm products.

THE IMPORT SITUATION

Our agricultural imports totaled $5.8 billion in 1971, exceeding those of all other countries except West Germany. Many developing countries depend on dollars earned from their agricultural exports to pay for imports of manufactured goods.

A large proportion of the developing countries' agricultural exports enter the United States duty-free or at higher than world market prices. Coffee, cocoa, tea, rubber, bananas, and most spices enter without import duties. Sugar exporters are paid substantially higher prices in the United States than in other markets.

> Latin American countries exported $1.6 billion worth of agricultural products to the United States in fiscal year 1971, which helped to finance the $4.5 billion in nonagricultural imports from the United States. Among the Latin American Free Trade Area countries, only Venezuela has a favorable trade balance with the United States because of petroleum exports.

The Central American Common Market members depend even more on agricultural exports to the United States. These five countries purchased $356 million in U.S. nonagricultural products during 1970-71, but exported only $48 million in nonagricultural items. Shipments of $377 million in agricultural goods such as coffee, bananas, sugar, and meat allowed those countries to purchase U.S. manufactures without a substantial trade deficit.

In fiscal 1971, African countries shipped $630 million in agricultural products to the United States, compared with $490 million in nonagricultural items. At the same time, U.S. nonagricultural exports to Africa totaled $1,371 million and agricultural shipments amounted to $291 million.

Department officials went before the U.S. Tariff Commission in April 1971 to ask for a change in the "price break" mechanism applicable to quotas on three cheeses—Emmanthaler, Gruyere-process, and "other" cheese.

The Department contended that the 47-cent price break level, below which the cheese is subject to quotas, was ineffective and that rising imports of these cheeses priced above this level threatened to render ineffective or materially interfere with the dairy price support program.

The Commission report, submitted to the President in July, recommended elimination of the price break mechanism with new quotas established at a higher level. The President has the Commission report under advisement.

In the case of beef imports, the Department continued to employ the voluntary restraint program negotiated with principal supplying countries.

HELPING THE UNDERDEVELOPED NATIONS GROW

The international role of U.S. agriculture extends far beyond trade. It includes a major effort to help underdeveloped nations by sharing with them the many benefits of scientific and technological advances in agricultural production and marketing. Experience clearly demonstrates that a strong agricultural base is a prerequisite to economic development.

About 400 USDA specialists carried on 102 technical assistance projects in low income nations during fiscal 1971. In addition, the Department provided training in the United States for more than 3,100 foreign agriculturists, some of whom occupied high positions in their home countries.

These activities are carried out in cooperation with the U.S. Agency for International Development (AID), the Food and Agriculture Organization of the United Nations, the Peace Corps, the Organization of American States, development banks, U.S. universities, foundations, private industry, and other organizations engaged in helping the developing world improve its ability to produce and market food and fiber.

Progress was made in implementing the joint recommendations of USDA and AID to improve international development activities. (These recommendations were discussed in the 1970 Report of the Secretary of Agriculture.) The recommendations called for increased support of an international agricultural research network, more soil and water assistance, increased and more relevant training of agriculturists from developing countries, and emphasis on the development of institutional competence of central governments to plan and manage agricultural programs.

In its work with developing countries, the Department is shifting toward fewer overseas resident staff and more short-term consultant assignments. In 1967, 119 of the 374 USDA specialists overseas were short-term consultants. In 1971, 192 out of a total of 399 were on short-term assignments.

The following are some of the highlights of USDA international development assistance in 1971:

Executive Seminars: Two executive level seminars in administration and management were completed as part of a series which will eventually bring about 75 top Turkish agricultural administrators to the United States for training and study. Twenty-eight administrators have now received training. They, in turn, are supplying the leadership for an extensive and continuing middle management training program in Turkey. Such management expertise is greatly needed for successfully carrying out development programs in the emerging nations.

Agricultural Policy Seminar: Thirty-two key officials from 16 developing countries attended a month-long agricultural policy seminar in Washington. Seven of the thirty-two officials were second in command in their agricultural ministries. To eliminate langugage difficulties, the seminar was conducted in several languages.

Ministers of Agriculture Visit USDA: Ministers of Agriculture from the Democratic Republic of the Congo (now Republic of

Zaire), Liberia, Botswana, and USSR studied American agriculture and conferred with USDA officials in visits to the United States during 1971. The Ministers from Liberia and the Republic of Zaire came in response to personal invitations issued by the Secretary of Agriculture during his trip to Africa in July. This was the first visit by a U.S. Secretary of Agriculture to sub-Sahara Africa.

Mission to Turkey: A USDA team visited Turkey during the fall of 1971 to help find agricultural alternatives for farmers affected by the Turkish ban on opium poppy production following the 1972 harvest. Opium farmers in Turkey have little knowledge of the spread of a frightening international epidemic because of the use of opium or herion as a drug is virtually unknown in Turkey. The ban on poppy cultivation, while extremely important in its potential world benefits, is an economic blow to Turkish agriculture. The USDA team studied the agricultural situation of the seven provinces in Turkey that produced opium in 1971. Major emphasis was placed on developing specific program and policy recommendations which would increase farm income from alternative crops, minimize social disruption, increase foreign exchange earnings, and create a pilot economic development program.

USDA/Peace Corps Work Begins: Work began under a Peace Corps/USDA agreement signed late in 1970 to bring the capabilities of both agencies together for more effective efforts in low-income nations. Among the projects undertaken by USDA were training in extension methods for eight Peace Corps volunteers going to Mali, briefing in cooperative management for ten volunteers going to the Ivory Coast, and backstopping of Peace Corps efforts by USDA specialists in Mali, Niger, Liberia, Upper Volta, and Dahomey.

Nutrition Improvement: The Department helped establish a program in the Philippines for evaluating the use of a CSM mix (corn, soya, milk) as one approach to alleviating malnutrition. We are also testing the use of CSM in India.

These are parts of a much broader nutrition improvement effort by USDA in cooperation with AID, private companies, U.S. universities, and foundations to find methods for increasing the supply of protein and other nutrients in the low-income nations. The methods being used include the creating of entirely new protein foods, breeding cereal grains for higher protein content, and fortifying existing food supplies with essential amino acids or protein isolates.

Senegal Project Phased Out: Senegal agriculturists took over the Casamance rice production project as USDA advisors completed their tours there. This project demonstrated techniques for producing rice, corn, and peanut yields three or four times higher than traditional yields.

Setting Up Statistical Systems: USDA specialists in commodities, sampling, data processing, cartography, computer hardware, and surveys continued to make periodic, 3- to 4-week trips to Colombia during the year to work as consultants to the Colombia National Department of Statistics. Our specialists have helped develop and train a staff for this Colombian department, established a regular series of current agricultural data, and enabled the department to begin forecasting production. A similar program is underway in Panama. Such statistics gathering and analysis systems are vital to agricultural development planning.

El Salvador Strengthens Marketing Systems: An 18-man Ministry of Agriculture marketing department, established after USDA/AID advisors began work in El Salvador in 1963, played a major role in several marketing developments during 1971.

Work was begun on 10 new market facilities, jointly financed by an Inter-American Development Bank loan, the Government of El Salvador, and the City of San Salvador.

A cattle slaughtering plant was renovated to meet U.S. inspection requirements and four Salvadorian veterinarians were trained in the United States in meat inspection techniques.

Changes in grain storage sampling procedures increased handling capacity by 150 percent, eliminating a serious bottleneck.

Agricultural Assistance to Vietnam

The Department's largest technical assistance team, as in recent years, was in Vietnam. USDA specialists cooperated with the AID Mission and government officials to help increase production of rice, poultry, and pork, to improve seed varieties, and to make cooperatives and credit institutions more effective. USDA specialists in Vietnam have been drawn from the Economic Research Service, Extension Service, Agricultural Research Service, Farmers Home Administration, Forest Service, and the Statistical Reporting Service.

Extension has been particularly active in South Vietnam. A 16-person team provided advisory services in the areas of national program planning and regional program operations to the Ministry of Agriculture. Besides an active role in the planning of rice, feed grains, livestock, poultry, and farm mechanization programs, the specific achievements of this team include the design and manufacture of a low-cost grain dryer and several row crop implements; a beef cattle feasibility study to support an application for a World Bank loan; and operational expansion of ththe national feed grain production programs.

Another 3-person team of highly specialized personnel worked with the Vietnamese National Institute of Bacteriology to improve training programs for NIB personnel; improve and standardize quality of animal vaccine production; and to increase production capability to meet normal immunization demands and create buffer stock inventories to cope with possible epidemics.

USDA advisor explains proper use of fertilizer to Vietnamese farmer.

American farm equipment is used for precision land leveling in rice production.

Vietnamese home demonstration agents are shown attending a training school.

Home demonstration agent shows proper use of U.S. foods to Vietnamese.

Other Assistance

Extension provided in-country technical assistance to 20 other countries in Latin America, Africa, the Near East, and South Asia. Twelve staff members worked in nine countries on resident assignments, while short-term assistance ranging from a few weeks to a few months was provided to 15 countries by 16 technicians. Their major areas of interest included nutrition, home economics, farm management, marketing, livestock and crop production, refrigeration and storage, communications and program evaluation.

The Department's international reputation for soil and water conservation expertise continued to generate requests for assistance from developing countries. In 1971, the Soil Conservation Service had 20 top field specialists in India helping with water management demonstration projects. Short-term consultants were assigned to Brazil and Argentina under an agreement with the Organization of American States. And a number of other nations requested and received help in solving their soil and water conservation problems.

Besides providing or arranging for training for about 350 cooperative and government officials and students from foreign countries, the Farmer Cooperative Service had three cooperative specialists stationed in Brazil and one each in Colombia and Paraguay to advise and assist on cooperative development.

Forestry officials from low-income nations, including Thailand, Vietnam, and Indonesia, were trained by Forest Service specialists in foreign management and in the development of wood products and forest industries.

Economic Research

Economic analysis has been an essential ingredient in the success that U.S. agriculture has had in international affairs. Economics is concerned with how resources are allocated to achieve desired objectives, and agricultural economists in ERS have been engaged in analytical studies which aid U.S. policy makers in developing export opportunities for U.S. agricultural commodities. Some of our analysis is also useful in determining efficient courses of action in overseas aid programs.

A prime example of ERS research aimed at maintaining and enlarging foreign markets for the U.S. farmer is a series of analytical reports on the grain-livestock sectors of Argentina, Australia, and Canada. ERS economists personally visited the Pampas of Argentina, Australia's "Outback," and the grain regions of Canada, interviewing government officials, economists, representatives of trade associations, and farmers and ranchers.

Research in all three countries focused on the growth potential of the grain-livestock sector and, in turn, became an input into studies concerning the competition the United States might face in international markets in the mid-1970's, based on different sets of assumptions.

> For Australia, the research indicates that a substantial expansion of production can be expected in beef, feed grains, and oilseeds (particularly if wheat quotas are maintained). The analysis of the situation in Argentina indicates an expansion in corn and sorghum output, with beef and wheat production remaining stable. In Canada, there will be increased emphasis on feed grains, oilseeds, and livestock, although wheat will continue to be Canada's most important grain crop.

The impact of the European Economic Community (EC), and the problems of an enlarged EC—with Britain, Norway, Denmark, and Ireland probably joining the six existing members—has been a matter of continuing concern to economists in ERS. The United States is alarmed that the Community has raised barriers to imports of U.S. farm products and is also providing keen competition in other markets.

A sampling of titles of published reports and articles reflects the conern of ERS economists with both the short and long-run implications of EC agricultural and trade policies, and enlargement of the EC: "Britain's Entry into EC Threatens the Position of New Zealand's Farm Exports," "Australian Farm Trade Concerned About Britain's Membership," "Common Market Benefits Lure Danish Farmers Toward EC Membership," "EC Sets Higher Farm Prices, Adopts a New Program for Structural Reforms," "Agriculture in the European Community and the United States (1958-68)," "European Community May Strengthen Trade Ties with Latin America," and "Monetary Crisis—Implications for Agriculture in the EC."

A report entitled "Use of Wheat for Feed in the European Economic Community with Projections to 1975" notes that EC agricultural policies have resulted in significant surpluses of soft wheat. Although some wheat is fed directly on farms, a large tonnage must be exported or denatured for feed at high cost. The EC now generously subsidizes the denaturing of wheat for feed. Use of wheat for feed in the EC is projected in the study as ranging from 9.5 to 11 million metric tons in 1975. Such usage could displace from 8.5 to 14.5 million metric tons of feed grains, depending on which feed grain is selected. The impact on U.S. exports of feed grains to the EC could be significant.

THE WORLD FOOD SITUATION

World agricultural production has increased at an average rate of about 3 percent per year for the past decade. This has been true of the developed and developing countries alike. World food production in 1971 was one-third more than in 1960. The gain was even larger in the developing nations, but population also increased more rapidly in these countries. As a result, per capita food production between 1961 and 1971 rose about 20 percent in the developed countries, compared with about 4 percent in the developing nations. In some developing areas, such as Africa, per capita food production is about the same or even slightly lower than 10 years ago. On the other hand, in Latin America, East Asia, and South Asia, per capita food production is significantly higher than a decade ago. In the Far East, where the Green Revolution is concentrated, there has been a steady rise in per capita output in the latter part of the 1960's and early 1970's.

Generally favorable weather and the greater availability of high yielding seeds and fertilizer resulted in good harvests for most of the world's regions in 1971. Production of grain, which largely reflects the availability of food throughout the world, reached high levels. World wheat output in 1971 increased about 9 percent over 1970, production of feed grains was 13 percent larger, and rice production outside China was unchanged. Grain is important as an indicator of food availability because it furnishes most of man's food either directly or indirectly as feed for livestock and poultry.

In general, larger crops of grain were produced in all major areas of the world. The use of high yielding varieties of wheat and rice continued its rapid expansion in the Far East. Food grain production in India increased about 10 percent over the preceding year. About 28 percent of India's rice production is derived from high yielding varieties. Most of the new rice varieties are harvested 2 months earlier than the traditional varieties and double cropping with wheat is spreading. India claims to be near self-sufficiency in in food grains, and other developing countries have also set goals of self-sufficiency.

Problems of Developing Countries

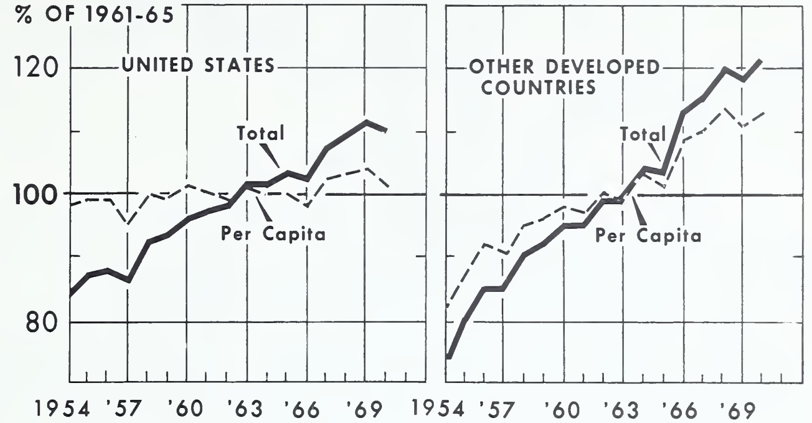
In some cases the benefits of increased agricultural production in the lower income countries are going principally to wealthy farmers, those with irrigated land and more management experience. How to organize agricultural development in a society characterized by many small farmers with severely limited resources so that more of them can have more income is a basic problem.

Unemployment is another major concern. In many low-income nations, unemployment levels range between 20 and 25 percent.

Nutrition problems are still serious, the result in part of unemployment and the inequitable distribution of the benefits of the Green Revolution. Even where the food situation has improved considerably, as in India, which now claims to be nearly self-sufficient in food grains, vast numbers of people lack the money to buy the food they need. Studies on India indicate that between 40 and 50 percent of the population currently have incomes below the national reestablished level required to satisfy basic nutritional needs.

Even in nations achieving economic growth, people at the lowest end of the income scale sometimes are not better off but in worse condition. Increased plantings of high-yielding wheats, for example,

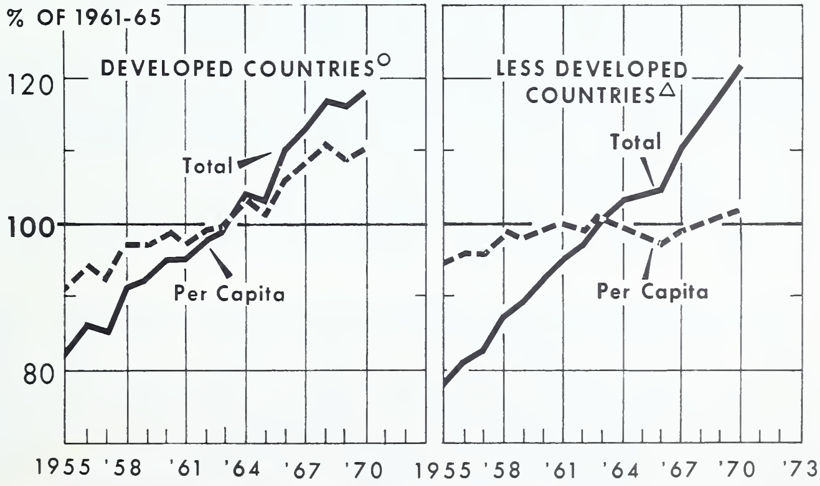
AGRICULTURAL PRODUCTION: UNITED STATES AND OTHER DEVELOPED COUNTRIES*



* CANADA, EUROPE, USSR, JAPAN, REPUBLIC OF SOUTH AFRICA, AUSTRALIA AND NEW ZEALAND.

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 7076-71 (8) ECONOMIC RESEARCH SERVICE

WORLD AGRICULTURAL PRODUCTION



○NORTH AMERICA, EUROPE,USSR, JAPAN, REPUBLIC OF SOUTH AFRICA, AUSTRALIA AND NEW ZEALAND.
△LATIN AMERICA, ASIA (EXCEPT JAPAN AND COMMUNIST ASIA), AFRICA (EXCEPT REPULIC OF SOUTH AFRICA).

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 4750-71 (8) ECONOMIC RESEARCH SERVICE

may cause reduction in the supply of food legumes, one of the cheapest sources of good quality protein.

Successful agricultural economic development, therefore, requires more than the application of technology in the emerging nation. The development process must also come to grips with problems of income distribution, unemployment, nutritional deficiencies in particular groups, and other priorities which are changing in the wake of the "green revolution."

THE OUTLOOK FOR TRADE

The future of agricultural trade is being significantly affected by many events over which farmers have no control: Improved grain crops around the world. Enlargement of the European Community. The prolonged strikes by longshoremen in major U.S. ports.

It appears that these events will bring some reduction in our agricultural exports in fiscal 1972. However, U.S. farm exports have climbed by a billion dollars in each of the past 2 years. Even with some decline from the 1971 record, fiscal 1972 could still be the second biggest agricultural export year in U.S. history.

There is reason to be positive about the future—and optimistic that our Nation's agriculture can compete in world markets and increase exports, providing that progress can be made in reducing barriers to trade.

Looking ahead through the end of the 1970's, we find encouragement in growing evidence that economic development is accompanied by a greater demand for livestock and poultry products. This has enormous implications, not only for trade, but for all agricultural institutions, here and around the world.

For more than 15 years, the United States has followed a policy of encouraging expansion in production of feed grains and other livestock feeding materials. Since 1960, our total domestic use of feed concentrates has increased by nearly a fifth, from 136 million metric tons to more than 162 million. Feed grain use is up by 15 percent. The use of wheat for feed has more than doubled. The use of other feeds, principally soybean meal, has increased by 24 percent.

During the past decade, this trend has begun elsewhere in the world. Japan is swinging to a livestock-feed economy, with emphasis on swine and poultry, and the United Kingdom has done the same. The European Community has also expanded poultry and swine production, but has not yet developed a favorable economic climate for the production of quality beef. Consumption of red meat, poultry, eggs, and other livestock products has skyrocketed in many of our dollar export markets.

Of the record U.S. export of $7.8 billion worth of farm products in fiscal 1971, nearly $3 billion consisted of feed grains, feed ingredients, and oilseeds largely fed to poultry and livestock. We also exported nearly $1 billion worth of livestock, poultry, and poultry products. Of our total agricultural exports, therefore, $3.9 billion, exactly half, consisted of animal products or raw materials for animal and poultry production.

Japan exemplifies the growing market for livestock feed in the developed countries. In fiscal 1960, the United States sold Japan 258,000 metric tons of feed grains and 1.1 million metric tons of soybeans. In fiscal 1971, we sold the Japanese 5.9 million tons of feed grains (a more than 20-fold increase) and 2.8 million tons of soybeans (an increase of 155 percent).

This year the world trend to a livestock and feed economy has become much more evident in the Soviet Union and its East European neighbors. U.S. exporters are already into these East European markets to a considerable extent. U.S. sales of soybean meal to Poland, Czechoslovakia, Hungary, East Germany, Bulgaria, Yugoslavia, and Romania have increased from $1 million in fiscal 1960 to $50 million in fiscal 1971.

The recent large sale of U.S. feed grains to the USSR indicates the possibility of developing a market there. But there also are other indications. The Russians bought more than 100 million pounds of beef, veal, and mutton from Australia and New Zealand in 1970 and almost doubled that quantity in the first 9 months of 1971. The USSR is also importing substantial quantities of frozen poultry meat from Europe. And Russia is buying significant numbers of beef breeding cattle from free world markets. If the USSR is to meet its ambitious goals for the production of livestock and poultry, substantial imports of livestock feed may be necessary.

If we pursue our markets, both old and new, and do a good competitive job of selling and serving our customers, we can unquestionably look forward to attaining the President's goal of $10 billion in agricultural exports.

IMPROVING AMERICAN NUTRITION

"We believe in compassion toward those in need."

Beginning with the historic Presidential Hunger Message of May 6, 1969, the Nation has been engaged in a massive national drive against hunger and malnutrition.

With public concern and support for the antihunger campaign, gathering increased momentum during 1971, food producers, industry groups, public and private agencies and individual citizens worked actively with government to improve and expand effective food delivery systems for the needy. In addition, public and private groups developed and tested innovative means of improving nutrition knowledge among all income groups.

Key leaders of the White House Conference on Food, Nutrition, and Health met at Williamsburg, Va., in February 1971 to assess the progress made during the 14 months since the Conference was held in Washington, D.C.

While large-scale efforts are still required to fulfill the national commitment to eliminate hunger in America for all time, achieving the goal is a realistic hope.

FOOD ASSISTANCE PROGRAMS

We are placing major emphasis on improving the nutrition of America's children, especially the needy. Inadequate nutrition in childhood can have life-long effects, not only on the capacity for physical and mental development but on the total personality.

Child Nutrition Programs

The thrust to reach "every child from a family whose income falls below the poverty line with a free or reduced price lunch" gained considerable momentum in 1971. Public Law 91-248, which President Nixon had signed into law May 14, 1970, to strengthen child feeding legislation, became fully effective early in 1971.

By the spring of 1971, the number of needy children receiving school lunches had climbed to 7.3 million, from 5 million a year earlier, the biggest increase in any single year of program operation. By the end of the calendar year, the number had risen to 8.1 million.

Rapid expansion of school lunch service pointed up an urgent need to reform the method of disbursing Federal school lunch funds to State educational agencies. Rather than continue allocating all school lunch funds by formulas that allowed some States to "feast" and left others in "famine" until funds could be redistributed, the Department in mid-1971 initiated a plan to guarantee basic Federal payments for every lunch served. These payments were set at an average 6-cent rate for all lunches, and an additional 40-cent minimum for lunches served to the needy.

For the first time, school lunch funding to States was put on a "pay for performance" basis, promising a more effective means of encouraging and monitoring delivery of lunch service to children.

Many school districts applied new technology in innovative ways to get lunches to children in schools previously incapable of food service.

> For the first time, some 12,000 youngsters attending 39 innercity schools within the Archdiocese of Chicago began receiving hot lunches at school. About three-fourths of the meals are served free or at a reduced price to needy children. Since many of their schools were in aging buildings not equipped with kitchens nor adaptable to their construction, school officials decided on a central kitchen food service system. Three-fourths of the cost of equipment and installation (some $170,000) was met with Federal funds allocated by USDA. Volunteers help make sure that each youngster receives a hot pack, a cold pack already equipped with eating utensils, and a half-pint of milk. Disposable containers simplify cleanup and the lunches can be eaten either in a lunchroom or at desks.

In all, the school lunch program was helping provide nutritious lunches to some 25.4 million children by the end of calendar 1971. The law requires that in all cases those receiving free or reduced price lunches must not be embarrassed by any overt identification that would allow classmates to know of their need.

Additionally, a record total of over 1 million needy children received lunches through summer recreation programs—almost eight times the number (134,000) served in the summer of 1969. Many of the playground sites were located in innercity areas. The Special Food Service Program for Children also served meals to some 150,000 children in year-round day care centers.

More children than ever before received nutritious breakfasts at school in 1971. The School Breakfast Program is aimed at children from needy families who arrive at school without having breakfast and at youngsters who travel long distances to school. Over a million of the Nation's children in some 7,000 schools are getting a better start for the day with a breakfast before classtime.

Nutrition and Technical Services

In child feeding programs, many schools need foods that are nutritious but lower in cost, or which require less preparation than traditional foods. To help meet these needs, USDA announced specifications for a nutritionally fortified cake-type product with a cream filling, which when served with milk, meets nutritional requirements for a school breakfast. It permits a school without food service facilities to serve breakfast much more easily than it could otherwise.

Additionally, the Department has approved and developed specifications for the use of high protein macaroni and textured vegetable protein products in school lunches. The products, made from such protein sources as soybeans and cereal flours, are combined in proper percentages with such foods as chicken, fish, or meat to help make up the protein needed in school lunches.

Food Distribution Program

During 1971, the Food Distribution Program made significant progress in improving service to needy families and upgrading the nutritional impact on their diets.

In June 1971, the Department signed a direct agreement with the Navajo Nation which extends into three southwestern States, to assure equitable service to needy Indian families. The agreement gives the Navajos sole responsibility for determining which of their families are needy and for ordering and distributing foods.

To improve food delivery, 91 counties converted to the store-like, self-service method of distributing food to recipients, bringing to 95 the number of such counties in 11 States.

The Department also improved the nutritional value of donated foods, so that food offered now contains 100 percent or more of the Recommended Daily Allowances of protein, minerals, and vitamins. Foods fortified with nutrients include juices, macaroni, evaporated milk, flour, instant nonfat dry milk, instant potatoes, cornmeal, grits, farina, and rice. An instant rice cereal fortified with iron and B vitamins is also being distributed to infants of needy mothers under the Supplemental Food Program, and distribution of powdered infant formula was begun on the Navajo reservation.

USDA strives to provide preferred foods to various ethnic and regional groups. Pinto beans, for example, were supplied to Indians and Mexican-Americans in the Southwest. Corn grits, a regional favorite, were distributed to several Southern and Midwestern States.

Total food distribution participation remained at about the level of the preceding year. In 1971, about 1.3 billion pounds of food, valued at over $321 million, were distributed to an average of 3.9 million persons.

Food Stamp Program

By the end of 1971, food stamps were helping 11.2 million needy people, 1.5 million more than in December 1970 and more than three times the number participating in December 1969 (3.6 million persons). This is the result of a substantial improvement in program benefits put into effect early in 1970 and further improvements in 1971.

Major reforms in the Food Stamp Program are resulting from P.L. 91-671 which the President signed on January 11, 1971, amending the Food Stamp Act of 1964.

The highlights of the changes which States successively put into operation beginning in November 1971 include:

- Establishment of uniform national eligibility rules.
- A stamp allotment sufficient to purchase a nutritionally adequate diet with the cost limited to 30 percent or less of household income.
- Free stamps to the poorest of the poor.
- A food stamp household defined as a group of "related" individuals.
- A requirement that able-bodied persons, with exceptions, register for and accept reasonable job offers.
- Variable purchase requirements enabling food stamp users to buy less than full monthly allotments.
- Use of food coupons by elderly to purchase meals delivered by defined agencies.
- "Fair hearing" rights for aggrieved program participants.

Another provision of the new regulations allows for public assistance withholding, a process whereby the cost of food stamps is deducted automatically from public assistance checks, and the stamps are mailed to participants. A trial program has been operating successfully in the State of Washington since 1970.

Numerous cases were reported in which automatic deductions saved people time and trouble, especially where they had to take time off from work in order to wait in line to buy stamps. One food stamp user from Olympia, Washington, wrote that the automatic process allowed more time to devote to her primary goal: To get off public assistance.

USDA Food Purchases

During the fiscal year USDA bought more than 2.3 billion pounds of food products for donation to schools, needy families, public institutions, and persons in emergency situations. In addition, other foods were provided for use in these programs from CCC stocks acquired under price support operations.

Two different direct purchase programs are used for food donations. One is the "Section 32" program, based on a 36-year-old law which allots 30 percent of all customs receipts to uses improving the marketing of agricultural products. Most of the food purchases on the open market are made under this program.

The Child Nutrition Act also authorizes USDA to make purchases on the open market to help provide nutritious lunches for children.

Following are some typical examples of the multiple benefits achieved through these programs.

> Commercial pork production hit a record 14.4 billion pounds during fiscal 1971, and hog prices dropped sharply. USDA purchases, amounting to about 2 percent of production, improved diets for needy persons and children. The purchases also helped bolster prices as much as 4 to 5 percent, or about $1 per hundredweight, above levels that would otherwise have prevailed from August 1970 to May 1971.
>
> The heavy apple crop of 1970-71 depressed growers' prices in practically every apple-producing State. About 3.5 million boxes of the 151 million box supply were not even harvested because of economic conditions. USDA bought fresh apples, apple juice, and apple sauce in amounts equivalent to about 2 percent of the crop. With season average prices ending about 10 percent higher than in 1969-70, the purchase program benefited growers and consumers.

Through such purchases USDA supplied over $625 million worth of meats, fruits, vegetables, fruit juices, and other foods to needy persons and school children.

Plentiful Foods Program

This is another dual purpose program which strengthens producers' income and helps American consumers use abundant supplies to better advantage. A reliable list of specific foods that are in heavy supply is prepared by the Department and publicized monthly through the mass media and food industry outlets.

A new, registered symbol for the program was developed during the year to help consumers identify which foods are plentiful each month. This symbol is being used all across the United States by cooperating food chains and grocers, as well as by newspapers, magazines, and TV stations, to draw attention to foods on each month's official list.

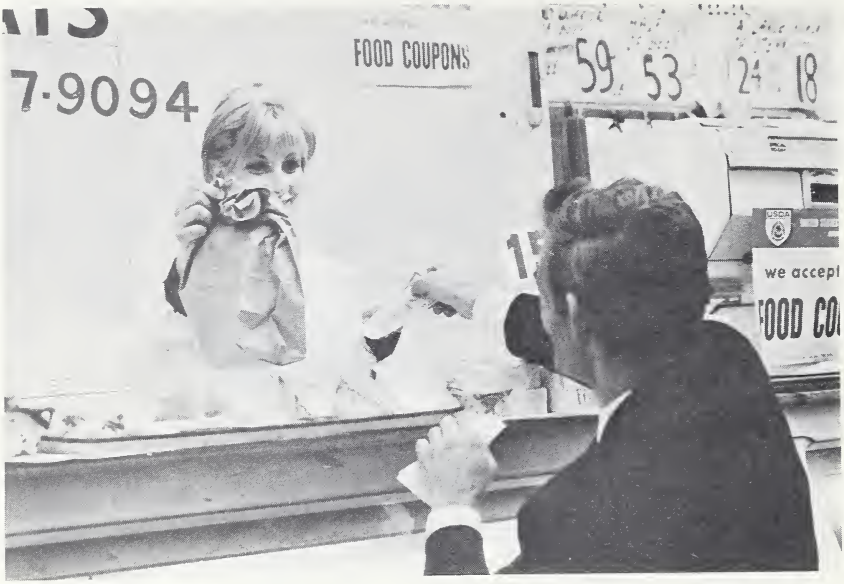
IMPROVING NUTRITION EDUCATION

Extension's Expanded Food and Nutrition Education Program continued to grow throughout fiscal 1971. The number of families enrolled increased by more than 100,000 during the year, bringing the total program families to about 350,000 or more than 1.6 million individuals. Families enrolled since the inception of the program now exceed 500,000.

The EFNEP was designed to provide educational assistance on a personal basis to low-income and disadvantaged families.

School children enjoying a nutritional breakfast.

And a well-balanced school lunch.



Using food stamps to stretch the food dollar.

An Extension aide gives low-income homemakers tips on meat purchasing and preparation.

Nonprofessional aides are recruited, trained, employed, and supervised by professional Extension home economists to assist such families on a one-to-one basis with meal planning, shopping, better use of donated foods, obtaining food assistance, family nutritional needs, and other subjects that may significantly affect the family's nutritional level. The number of nonprofessional aides serving EFNEP families during the year increased from about 7,000 to more than 9,500.

Effectiveness of the Program

A cooperative program of research is carried on by the Economic Research Service and the Extension Service to evaluate the effectiveness of the educational effort and to suggest means of improving its efficiency.

Data collected in 1971 showed that more than 60 percent of the EFNEP program families had incomes of less than $3,000 a year, and only 9 percent had incomes exceeding $5,000 a year. Program families averaged 4.8 persons.

Two-thirds of the families were members of minority races, more than 46 percent being black and nearly 18 percent Spanish-American. About 60 percent lived in urban areas; less than 7 percent were farm families. Around 35 percent were receiving welfare; and 36 percent of the homemakers had completed less than eight grades of school.

More than 53 percent of the aides were of minority groups; 39 percent were black and 12 percent were Spanish-American.

An analysis of individual family data in a national sample of more than 10,000 EFNEP families showed that these families spent more than 35 percent of their income for food. Diets were generally most deficient in fruits, vegetables, and milk products.

Homemakers with the poorest initial diets tend to be urban, on welfare, poorly educated, and they have the lowest income and the smallest expenditures for food.

Program families made marked improvement in their diets as measured by the number of daily servings of food from each of the basic four food groups. Every 6 months, program homemakers are asked to provide information on food eaten during the previous 24 hours. The following table summarizes the change occurring, as reported in the food recalls, in homemakers participating in the program more than a year. The first recall was taken when the families enrolled in the program.

	1st recall	2nd recall	3rd recall
Homemakers consumed at least two servings from the meat and milk groups and 4 servings each from the fruits and vegetables and bread and cereal groups.	9.2%	14.4%	17.9%
Homemakers consumed at least one serving from each of the basic four food groups.	58.1%	69.3%	74.1%
Homemakers reported having eaten at least one serving from each of the basic four food groups.	50.7%	32.3%	27.7%
Number of homemakers reporting	89,445	65,888	53,269

The following examples typify the achievements of the nutrition education program.

> Working with an aide who showed her how to plan menus around donated foods, an Oklahoma homemaker with three children reduced her grocery bill from $70 to about $35 a month. Her only income is a disability check and donated food.
>
> Another homemaker, helped by an aide to plan her shopping around donated foods and to substitute powdered and evaporated milk for fresh milk for her family of six children, reduced her grocery bill from about $80 a month to between $35 and $40.
>
> In Louisiana an aide began visiting a sick mother with a family of seven children. Although rejected at first the aide finally enrolled the family in EFNEP, helped the mother plan meals around the basic four food groups, and encouraged her to eat properly. After several months of help, the homemaker largely recovered, is again cooking for the family, eager to learn more about good nutrition, and getting along well. The entire family has a new outlook on life.
>
> Another aide, visiting a family of nine, found the father unemployed, the baby in the hospital for 2 weeks, and credit for groceries exhausted. This family was totally unaware of the food stamp program. The aide explained the program, arranged transportation so the father could enroll, and began assisting with budgeting and teaching the homemaker to stretch her food dollars.

A Colorado aide found a mother, the sole support for seven children, who was spending her food money on expensive and not too nutritious items. After instruction in menu planning and shopping the homemaker now buys food in larger quantities, uses canned whole milk and powdered milk, is cooking cereals, dry beans, and peas, rice, and macaroni. The family is eating well, and buying meat, eggs, cheese, and fresh or canned vegetables on sale. Food stamps have also helped them live better.

Working With Youth

Nutrition education is not limited to adults nor to low-income homemakers. Specific and intensive programs are conducted for youth, including those from low-income families.

In fiscal year 1971 more than 1.2 million youth participated in Extension nutrition programs. Over 780,000 were enrolled in the regular 4-H Food and Nutrition Programs, and almost 600,000 participated in nutrition programs designed specifically for youth under the EFNEP.

The youth education programs basically emphasize relationships between good nutrition and health, the need for good nutrition, what constitutes good nutrition and how to prepare food to retain nutrients. Teaching methods include regular meetings where educational materials are presented, individual projects, day camps, and other camps and groups in which nutrition information or activities are given a prominent place. Volunteers provide the adult leadership in youth nutrition programs. More than 34,000 adults volunteered and served as leaders in 1971.

To broaden information on the value of good nutrition, the Extension Service produced a series of six one-half-hour television films under the title "Mulligan's Stew." The series is scheduled for distribution early in 1972 and will be released along with supporting literature to State Cooperative Extension Services for scheduling on Education TV networks and/or commercial stations. The promotion will emphasize that the program is for all youth. State Extension Services will arrange local programming and distribution of materials.

Other Nutrition Education Activities

Inadequate nutrition, of course, is not limited to low-income and disadvantaged families. Even among the relatively affluent, inadequate nutrition is not uncommon, due to ignorance, indifference, and self indulgence.

Extension continued its emphasis on nutrition for all persons, especially through Extension homemaker groups which carry information to 10 million homemakers through volunteer leaders trained by Extension home economists.

Special programs, using newsletters prepared by county Extension home economists, newspaper columns, radio and television programs, are conducted for young homemakers and mothers of young children who cannot attend meetings. Senior citizens are reached through social workers, welfare workers, and others who have personal contact with the aging and who have had Extension training in meeting their nutritional needs.

Research

Nutrition research in the Department has a long-range goal of dietary improvement to help insure to all people optimal health, well-being, and satisfaction, or alternatively, to prevent, modify, or postpone health problems and the aging process. Everyone would share in the benefits from the application of nutrition knowledge.

One of the most significant findings of the year resulted from a pilot study made by Johns Hopkins University, Baltimore, Md., and funded by ARS. It showed that about 40 percent of the Negro children through the sixth grade refused to drink milk in the school lunch, compared with only 10 percent of the white children. In a random study, it was found that over half of the Negro children tested, milk drinkers as well as those who rejected milk, could not adequately digest lactose, the sugar in milk. Only one-fifth of all the white children studied had a similar difficulty.

Since milk is the best food source of calcium—which helps build bones and teeth, helps blood to clot, and assists muscles and nerves to react normally—we obviously need to find ways to improve the tolerance of some children for milk.

A survey of seasonal food consumption disclosed that more U.S. families have poor diets during the spring than at other seasons. Vitamin C and vitamin A, which are found in fruits and vegetables, were more frequently below two-thirds of the amounts recommended by the National Research Council—Food and Nutrition Board in the spring than at any other time of the year. These shortages were more noticeable in the diets of families in the north-central and southern regions. In the West, calcium was a springtime problem, while in the South, the Northeast, and north-central regions calcium shortages occurred more often in summer.

The survey showed little variation in total food budgets or in the division of the food dollar among food groups from season to season.

An important area of research in recent years has been the study of trace elements. Of the approximately 100 known trace elements, scientists have already proved that 20 are essential to man. Indications are that several others will be found indispensable to the human body.

> For instance, chromium is important in the proper utilization by the body of the carbohydrate, glucose. Chromium stimulates glucose metabolism. ARS studies with experimental animals indicate that chromium acts as a cofactor for

> insulin. When chromium is deficient, the effectiveness of the insulin hormone is generally decreased, leading to inability of the body to tolerate or handle normal amounts of glucose. Some scientists now believe that the decline in efficiency of glucose utilization with increasing age may be related to a decline of tissue chromium levels, and that chromium supplementation can restore normal carbohydrate utilization. Studies are continuing in this area.

In a continuing review of the world's literature on human nutrient requirements, ARS scientists have completed a survey of the literature dealing with vitamin A requirements. In the 40-odd years since the discovery of this vitamin, research has been devoted mostly to the needs of infants and adults, with no controlled studies on the needs of adolescents, pregnant women, or elderly people. In addition to filling this gap, there is need for better methods of measuring vitamin A requirements and more knowledge concerning the usefulness of vitamin A derived from various food sources.

Vitamin C, which has received widespread attention in the public press, is being studied with regard to its metabolism in the body. Dietary tests, conducted in India under ARS sponsorship, indicate that excessive amounts of protein and some of the trace elements may inhibit vitamin C metabolism. This research, while advancing the understanding of vitamin C metabolism, has emphasized the importance of knowing more about the reciprocal activity of different nutrients in the diet. This sustains one aspect of traditional nutrition research—the importance of dietary balance. The interrelationships of nutrients in body metabolism provide an important area for scientific exploration.

Milk and other food products may be enriched with iron by using a new powder obtained by combining iron with the proteins in cottage cheese whey. Of foods tested so far, flavor is not affected by adding the iron-protein powder. If the powder should be approved by the Food and Drug Administration, its commercialization may provide a preferred means of enriching dairy products, bread, and other foods with iron.

In another aspect of diet interrelationships, scientists have found that even though dietary intake of iron may be sufficient, in some forms it does not become available to the body.

> The iron in eggs is only one-fifth as available as a standard iron salt. In one study, the addition of low levels of vitamin C to the diet of rats increased the absorption of iron from eggs. This supports other studies in humans, where orange juice (a good source of vitamin C) appears to increase the absorption of various iron compounds. The application of these findings in planning menus and food combinations could greatly alleviate today's existing iron deficiency problem in the United States.

The Department's Agricultural Research Service and the Interagency Committee on Nutrition Education co-sponsored a nutrition education conference in November on teenage dietary habits. The ICNE is composed of representatives from USDA, the Departments of Commerce, State, and Health, Education, and Welfare, and the American Red Cross, the Office of Economic Opportunity, Pan American Health Association, and Action.

The conference provided an opportunity for nutritionists and workers in allied professions at State and local levels to discuss values, life styles, eating and health habits, as well as physical, biological and social environment as they relate to teenage nutrition, and to consider effective ways of working with youth in the development of good food and habits.

At the other end of the age scale, ARS issued two important bulletins for the use of the aging: "A Guide to Budgeting for the Retired Couple" and "Food Guide for Older Folks." Both are designed to fill a gap in helping senior citizens have a more productive retirement life.

A new ARS bulletin, "Your Money's Worth in Foods," was designed and issued to help the homemaker decide how much she can reasonably afford for food, and how to plan well-balanced, tasty meals on a food budget. The bulletin offers a daily food guide, information on meal patterns and meal planning, and sample menus at two different cost levels to indicate possible food choices. It also shows amounts of various foods to buy per serving, and how many servings to expect from various sizes of frozen, packaged, or canned food products.

OTHER FOOD SERVICES

The people of the United States have the safest, cleanest, highest quality food in the world—in large part because of USDA inspection and standards and grading programs.

Meat and Poultry Inspection

A major overhaul of the entire Federal meat and poultry inspection program was initiated in 1971 to give consumers additional assurance of the wholesomeness of meat and poultry products. A principal aim of the reorganization is to decentralize functions by:

> Creating a direct chain of command between Washington program directors and assigned inspectors in packing and processing plants; and
>
> Providing a more direct line of Federal-State communication and cooperation.

In Washington, a new Field Operations Division now provides direct supervision over all inspection operations in the field. Regional offices have been given carefully defined supervisory lines of authority, which formerly were splintered among several points of contact.

In another major step, 36 area offices were established, primarily in State capital cities, to provide closer liaison with State officials, closer observation of State inspection systems to insure that standards "equal to" Federal inspection are maintained, and more uniformity among and between Federal and State inspected plants.

Circuit supervisors are being assigned to specific geographic areas within the boundaries of the area supervisor's jurisdiction and under the latter's direction. This step will free circuit supervisors to devote more time to monitoring inspection operations in each plant under their jurisdiction and to work with individual inspectors-in-charge designated for each plant.

> By the close of the 1971 calendar year, meat and poultry inspection systems in all 50 States, plus Puerto Rico, Guam, and the Virgin Islands, had been surveyed for their conformity to Federal inspection standards. Forty-five States were operating "equal to" meat inspection programs; intrastate meat plants in Minnesota, Montana, Nebraska, North Dakota, Puerto Rico, and the Virgin Islands were being inspected by Federal personnel; and Kentucky and Guam meat plants had been designated for Federal inspection beginning in January 1972.
>
> At the same time, 34 States were operating "equal to" poultry inspection programs, while intrastate poultry plants in Arkansas, Colorado, Georgia, Idaho, Kentucky, Maine, Michigan, Minnesota, Montana, Nebraska, North Dakota, Oregon, Pennsylvania, South Dakota, Utah, West Virginia, and the Virgin Islands were being inspected by Federal personnel. Likewise, "intrastate" plants in Puerto Rico and Guam had been designated for Federal inspection beginning in January 1972.

On June 30, 1971, there were 2,794 meat plants, 656 poultry plants, and 693 combination plants operating under Federal inspection. During the fiscal year, USDA inspectors examined 88.7 billion pounds of meat and meat products, and 26.3 billion pounds of poultry and poultry products. Some of this total represents items counted more than once, since some products are examined at various stages of slaughtering, boning, and processing to assure wholesomeness.

In the course of their inspections, USDA inspectors condemned 107 million fowl and 129,000 meat animals before slaughter; 45.5 million pounds of poultry and 13.3 million pounds of animal parts; and 2.2 million pounds of processed poultry products and 39.2 million pounds of processed meat products.

USDA compliance officers also detained approximately 9.3 million pounds of unfit meat and poultry products found in marketing channels after leaving processing plants.

During fiscal 1971, USDA stepped up its laboratory monitoring to guard against meat and poultry contaminants. About 1 million pounds of meat and poultry containing illegal residues were condemned.

Standards and labelling requirements are another important phase of the inspection system. USDA labelling specialists examined for accuracy and completeness 119,983 label designs submitted for approval in advance of their use by processors during fiscal 1971. Of these, 11,353 labels were rejected or returned for modifications to avoid confusing or misleading consumers.

As of January 1, 1971, 42 foreign countries were eligible to export meat to this country. To oversee day-to-day compliance with USDA inspection regulations, foreign governments throughout the year employed 9,402 inspectors in 977 certified plants exporting meat and poultry to the United States.

During the year, each certified plant was visited at least once by a foreign program officer from C&MS. These foreign program officers, now numbering 19 stationed permanently in respective countries, maintain a continuing review of approved foreign inspection systems to ensure that the same standards required in U.S. plants are adhered to by foreign plants. Foreign plant inspections during 1972 will be increased to a minimum of four per major exporting plant and at least two visits to certified plants that are inactive or engaged in a low level of production.

Egg Products Inspection

In December 1970, Congress enacted the Egg Products Inspection Act, to provide for the inspection of all liquid, frozen, or dried egg products beginning July 1, 1971, and for control of certain types of shell eggs beginning July 1, 1972. The Consumer and Marketing Service, which had been inspecting about 80 percent of the Nation's egg products under a voluntary program, administers the new law.

Regulations were adopted and inspectors were hired and trained. Some 170 egg products plants not under the voluntary program were surveyed and told of the changes they would need to make to be eligible for inspection when the law went into effect. As a result, 136 plants were placed under mandatory inspection; 95 of these had been under the former voluntary program. In fiscal 1972, an additional 35 to 45 plants are expected to become eligible. More than 500 plants, mainly shell egg packers who broke and sold cracked or dirty eggs as a sideline salvage operation, have discontinued production.

Standards and Grading

For over 50 years, U.S. grade standards and grading services for food and other agricultural products have improved the Nation's food distribution system. With growing consumer interest in both the quality and nutritional value of their foods, the Department has intensified its efforts to tell consumers what U.S. grades mean, and how they can use this knowledge advantageously when food shopping.

This is illustrated by the record demand during the year for the popular series of Consumer and Marketing Service leaflets telling consumers "how to buy" foods, of which 6 million copies have been distributed thus far. Other consumer education materials emphasized in fiscal 1971 included a new "teachers handbook," many low-income teaching aids, and a series of inexpensive posters—all designed around the "how to buy" concept.

The grading service, a voluntary program financed totally by fees paid by users, increased in volume in several areas in 1971. About 200 million more pounds of beef were graded in 1971 than in 1970; nearly 2.5 billion more shell eggs; nearly a billion more pounds of fresh fruits and vegetables, and some 200 million more pounds of poultry.

Grade standards are constantly updated to reflect changing market trends and consumer needs. For example, grade standards for potatoes were revised to provide consumers with cleaner potatoes and fewer defects.

In fiscal 1971, some 553 billion pounds of agricultural products—or about 10 billion pounds more than in 1970—were graded for quality by USDA and cooperating State graders, including:

14 billion pounds of beef—65 percent of total production.

421 million pounds of lamb and mutton—77 percent of total production.

7.2 billion pounds of poultry—also 77 percent.

19.6 billion shell eggs—28 percent.

3 billion pounds of dairy products—including 71 percent of the butter, and 45 percent of the nonfat dry milk.

58.5 billion pounds of fresh fruits and vegetables—50 percent of the total.

4 billion pounds of frozen fruits and vegetables—80 percent.

8 billion pounds of canned fruits and vegetables—40 percent.

9.8 million bales of cotton—97 percent.

2.1 billion pounds of tobacco—96 percent.

10.2 billion pounds of rice—91 percent.

Open Dating

Assurance of quality and freshness in the foods available for purchase is of prime importance to the Nation's consumers. In response to a Congressional request for information on the economic feasibility of open dating, research is underway to measure the effectiveness of food dating as a consumer protection measure. One phase of the research was conducted in cooperation with a leading supermarket chain in Chicago, Illinois. Results showed that while many shoppers were aware of open dates, relatively few understood their precise meaning. Most saw dates simply as an indication of freshness. Store managers generally were in favor of open dating, not only because it increases consumer confidence in the store, but also because it makes stock rotation easier.

Interviews with over 1,700 shoppers revealed that slightly more than half were aware of the readable dates on over 150 private label products. Of those shoppers who were aware of the dates, nearly two-thirds said they had used the date information, especially for bread and milk.

* * *

As this section of our report indicates, the American people in 1971 took another big stride toward the goal of eliminating poverty-caused hunger and malnutrition.

How to measure what has been achieved depends on which way we look.

Compare where we are today with where we were a year ago, or where we were in 1969, and the progress is almost unbelievable.

But compare what we have done thus far with what must be done to reach the goal of a well-nourished America, and much remains to be done.

We still must reach many more of the Nation's needy with food stamps, food distribution, and child nutrition programs.

A large gap exists between achievements and needs in the area of nutrition education.

To reach our food and nutrition goals nationwide, there will have to be an expansion in both the quantity and quality of our efforts.

With continued public commitment, however, America can, and will, reach this immensely worthwhile goal, a goal that is now clearly within reach.

NEW OPPORTUNITIES IN THE AMERICAN COUNTRYSIDE

"We must work to revitalize the American countryside."

The American people are still clearly on the move. The 1970 census shows further suburbanization near the major cities; a continuing but somewhat reduced rural-to-urban migration; a rural population that is increasingly nonfarm; and a decline in farm population to less than 10 million persons, under 5 percent of the U.S. total.

Population is increasingly concentrated on the coasts, with California, Florida, Texas, and New York leading the way in attracting new residents. Today slightly over half of all people in the United States live within 50 miles of the Atlantic and Pacific coasts, the Gulf coast, and the Great Lakes.

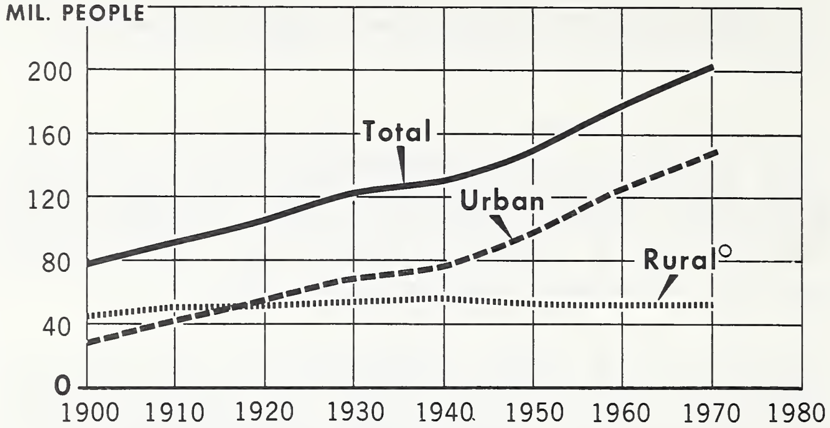
During the past two decades virtually all of our population gain—over 50 million persons—has been in urban areas. There has been almost no change in the total number of persons living in rural America. The net migration from rural America offset the natural excess of births over deaths. Two out of five U.S. counties actually lost population during the 1960's, and a considerable number of these counties have had declines in population each decade for 40 or 50 years.

Thus we have, simultaneously, increasing megalopolitan concentrations and declining rural areas. Many rural migrants are moving in response to what they see as a lack of economic and social opportunity where they live. Their departure contributes to a further shrinking of the population and tax base, inadequate social services, and an inability to generate enough jobs in many rural communities. It is a vicious circle.

The rural areas which lost population during the 1960's were primarily those in which agricultural employment continued to drop and nonfarm jobs did not develop enough to take up the slack. The proportion of the U.S. farm population 14 years of age and over engaged in agriculture fell from 66 percent to 54 percent between 1960 and 1970, while employment in nonagricultural industries rose from 33 to 44 percent. But in many rural areas the increase in nonfarm job opportunities was insufficient to meet the larger demand for new openings for those leaving agriculture or those entering the labor force for the first time. Consequently, many rural people sought economic opportunity through migration.

There was a net outmigration of 2.3 million persons from nonmetropolitan areas between 1960 and 1970. This was less than

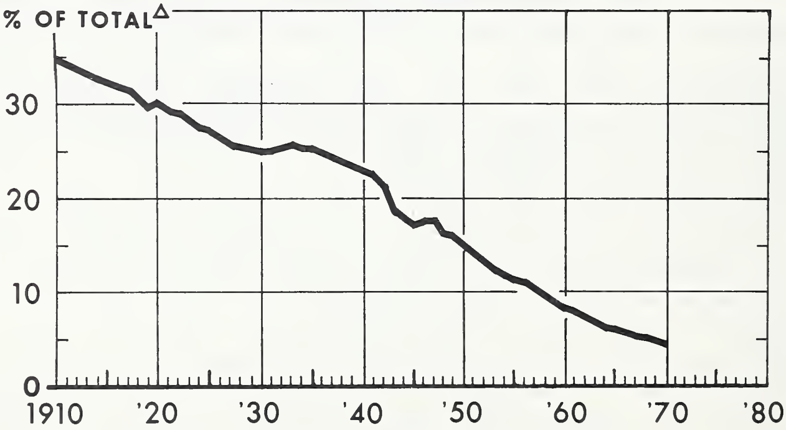
POPULATION OF THE UNITED STATES



○ DEFINITION CHANGED IN 1950 TO EXCLUDE SOME PEOPLE FORMERLY COUNTED AS RURAL POPULATION.
SOURCE: U.S. BUREAU OF THE CENSUS.

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 8204-71 (8) ECONOMIC RESEARCH SERVICE

FARM POPULATION AS SHARE OF U.S. TOTAL



△ TOTAL U.S. RESIDENT POPULATION

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 7907-70 (9) ECONOMIC RESEARCH SERVICE

half the number in the 1950's when net migration was 5.4 million persons. Even with this net movement out of nonmetropolitan areas, however, the excess of births over deaths produced an overall gain in population. The total population of all U.S. nonmetropolitan areas increased by 6.7 percent during the 1960's, a rate just half that of the population gain for the Nation as a whole.

The Great Plains, both north and south; the heart of the Southern Appalachian coal fields; the Mississippi Delta; and the Black Belt declined in total population between 1960 and 1970. Other rural regions which had lost population during the 1950's reversed the trend and gained during the 1960's, among them northern and western Arkansas, eastern Oklahoma, and southwestern Missouri.

PLANNING FOR RURAL DEVELOPMENT

If rural areas are to develop, more job opportunities as well as adequate community facilities and services are essential. Programs to enhance the productivity of the rural labor force are needed to sustain the relatively high rate of gain observed in income and output per worker in the past decade. Productivity per worker rose faster in rural areas than in urban areas during 1960-70. Progress in speeding up the rate of economic development of rural areas will depend heavily on creating new jobs within commuting distance of rural residents.

Steadily growing requirements for schools, water and sewer systems, roads, and other governmental facilities place a severe strain on existing sources of State and local tax revenues. In the private sector, suitable housing, sufficient capital and credit for housing and other business uses, adequate transportation, medical, and other privately provided community facilities are needed.

The 1970 census indicates that the quality of rural housing has improved considerably since 1960. The data show that in 1970, 12 percent of occupied housing located outside Standard Metropolitan Statistical Areas was substandard. The 1960 figure was 28 percent. Nevertheless, rural housing is still inferior to urban housing. The 1970 census indicated that about 63 percent of the occupied substandard housing units were located outside the Standard Metropolitan Statistical Areas, although these areas contained only 31 percent of all U.S. households.

Blacks and other minority groups have decidedly poorer quality housing than the rest of the population. In 1970, 49 percent of the housing occupied by Negroes in non-SMSA's was substandard, compared with 13 percent for the rest of the population. The Farmers Home Administration is helping to fill this gap, but FHA loans are made to the low-to-moderate income groups. The very poor households are not getting housing loans.

While local communities must consider their resources in facilities and services, as well as adequate housing, in attracting new industry, realistic planning must also look at trade-offs in terms of necessary additional services vis-a-vis increased tax revenues.

> For example, a recent USDA study showed that establishing new manufacturing plants in five towns in Kentucky often added more to the costs of local governments than it did to revenue. The net additions to costs, however, were relatively small and, in general, they would not raise serious problems for local governments if they were anticipated. The largest increase in costs occurred where the new plant attracted many workers from outside the county. In these instances school districts were likely to experience substantial cost increases.

Rurality, poverty, and poorer health are somewhat interrelated. In rural areas, income is generally lower and medical services are poorer and less accessible than in urban areas according to an ERS study. The incidence of chronic illness, which limits work activity and thus reduces income, increases with both rurality and low family income. Low incomes and sparse populations also prevent rural areas from competing effectively for medical personnel and facilities. Although general practitioners are well represented in rural areas, urban centers attract more specialists and hospital-based physicians.

USDA Gives Guidance

One of the most pressing needs of rural towns and counties is assistance in planning for social and economic development. Federal, State, and county governments provide expertise in this area, and many private organizations cooperate with local bodies in development planning. More than three-fourths of the States now have officially delineated multicounty planning and development districts to use resources more effectively. The USDA Economic Research Service has available for multicounty districts a set of social and economic indicators, based on the county unit, that indicate level of development and rate of growth. With these facts at hand, planning for development can be more realistic

The USDA in 1971 continued to intensify its efforts to bring to bear on the problems of rural America the programs of our own Department and those of other departments and agencies, both public and private.

The Extension Services provide educational and technical assistance to individuals and public and private groups to help them make their communities better places to live and work. This assistance ranges over the whole gamut of identified needs: Leadership and overall rural development; business and industrial development; manpower development, including job training and education; comprehensive community planning; housing; and water and sewer and solid waste disposal facilities; recreation and tourism; environmental protection; health and welfare.

Working directly with local leaders, Extension workers, trained in community resource development, help improve decisionmaking, mobilize leadership, define opportunities and problems more clearly, and point out the relative merits of various alternatives in accomplishing community objectives.

During fiscal 1971 more than 600 professional Extension workers devoted half or more of their time specifically to rural development, and nearly all Extension workers devoted part of their time to this effort. Aiding Extension workers in their understanding of local community opportunities and problems is their direct pipeline to the total resources of the land-grant colleges as well as access to State and Federal agencies.

During the year, Extension nationally assisted more than 8,700 community groups in community development projects and provided the educational and technical assistance on completion of more than 4,400 specific projects. Extension also assisted in conducting 876 feasibility studies on projects relating to overall rural development.

A BETTER LIFE IN RURAL COMMUNITIES

One of rural America's great handicaps has been its deficiency in housing, which we have already touched on.

During 1971 the housing program administered by our Farmers Home Administration reached levels of achievement that would have seemed impossible 2 or 3 years earlier.

The 1971 Housing Record

A half million rural people moved into new or improved homes made possible by FHA loans totaling almost $1.4 billion in fiscal 1971. These figures become even more impressive when they are compared with fiscal 1970—when the agency made loans of $793 million to provide housing for 295,500 people—and with fiscal 1969, when FHA loaned $512 million to finance homes for 219,600 rural residents.

Housing loan levels are projected to reach $1.6 billion in fiscal 1972, enabling the agency to assist over 550,000 persons.

Most rural housing loans are made for individual homes, but an increasing number are being made to provide rental housing. A reorientation of the FHA housing program has placed special emphasis on the development of multiple-unit housing. Contrary to some fear that rental units would not be accepted in rural areas, such units have proved popular with senior citizens, as well as other low to moderate income families, wherever they have been constructed. FHA may now loan up to $750,000 for construction of rental units. Agency personnel carefully supervise the building of rental units to make certain they are carefully planned, well constructed, and convenient to shopping, medical, and other services necessary to comfortable living.

FHA makes housing loans for low to moderate income families who normally cannot obtain credit from commercial sources. In most cases, homes are constructed by local builders for sale to qualified borrowers, or under a construction contract with a family. Families with very low incomes may qualify for special interest rates based on their ability to pay. In other instances, families band together in self-help projects. They do much of the building, and reduce the costs considerably.

> Carl C., of North Carolina, was forced to retire because of arthritis. Mrs. C. supported the family, working in an office.
>
> Their house, at the top of a steep, rutted, twisting road, was poorly heated by an old wood stove. Pasteboard, lining the badly cracked walls, could not keep out the snow that some mornings accumulated 2 inches deep on the floor.
>
> In January 1971 the C. family moved across the clearing into a comfortable three-bedroom home. A picture window commands a spectacular view of the surrounding mountains. Carl C., helped by two sons, a few friends, a skilled carpenter (hired by the Office of Economic Opportunity) and an FHA loan, built the house himself in the tradition of a frontier barn-raising.
>
> "It means just about everything to have a nice place to live and not freeze to death on cold mornings," he said. "It's not like it used to be, having to get up in the mornings and trying to start a fire. Now it's a nice 70 degrees all the time. Like having Miami, Florida, at my finger tips."

Carl C. and his family are typical of many families living in comfortable homes valued at $13,000 to $15,000, made possible by FHA assistance. They are low-income householders and most of them are far from skilled workmen; but they demonstrate that six to eight families working together evenings and on Saturdays under the supervision of a skilled carpenter can build some good homes.

When these self-help projects were begun in 1966, there was reason to doubt that inexperienced owner-builders could produce quality construction. Would labor-swapping work? Would the families keep up their payments once they moved in?

After 5 years, local leaders and government representatives are enthusiastic about the project. When people work on their own homes, their time becomes equity. The program builds houses—and people, too.

In addition to individual and rental housing loans, FHA provided funds for homesite development, grants for self-help housing technical assistance, and loans and grants for farm labor housing. The policy governing farm labor housing was liberalized to permit individual farmers, associations of farmers or farm workers, State or political subdivisions, or nonprofit organizations to borrow funds to build these facilities. In addition, the interest rate was lowered to one percent on the unpaid balance and grants may now be made for as much as 90 percent of the construction costs.

During the year, Farmers Home was also given authority to make housing loans in towns with as many as 10,000 people, and to qualified people living in any city anywhere who wish to move into rural areas or small towns.

Another new feature, the housing disaster loan program, offers rural residents whose homes have been damaged or destroyed by natural disaster special emergency credit to rebuild. These loans, made only to homeowners who have experienced a disaster-caused loss, in some cases defer payment of both principal and interest for up to 3 years. In Presidentially designated areas, $2,500 of an emergency loan above the first $500 may be cancelled on losses not compensated by insurance or otherwise.

The streamlined FHA housing programs make it easier for individuals to obtain loans and bring the private building and financing sector more effectively into the program, thus making good housing available to more people.

The "conditional commitment" phase of the program permits a builder to put up as many as 15 houses with the understanding that they will qualify for Farmers Home loans and that funds will be available for qualified borrowers. A new "packaging" concept permits builders to work with potential purchasers, using FHA forms to get all information required, thus smoothing the way for applicants to move into homes.

> In Mooresville, N. C., a group of homes built especially for low-income families will soon be ready for occupancy. Two local builders backed by Farmers Home conditional commitments are putting up the housing development to offer some relief to the town's low-cost housing crisis. Plans call for 80 single-family brick homes ranging in size from two to five bedrooms and in price from $12,000 to $17,000 with the average house and lot frunning about $14,500.
>
> The homes offer built-in stoves, central heating, and unless otherwise specified, one bath. Two-bedroom dwellings will have 1,000 square feet of floor space, with space increasing to 1,300 depending on the number of bedrooms. Lots are 10,000 square feet or larger.
>
> The builder praised the town government, the Chamber of Commerce, and the local Farmers Home county supervisor for their encouragement and assistance in planning the project. "It takes all of us to get the ball rolling on a program like this," he said.
>
> FHA assists in four ways: It appraises the house, conducts inspections, issues conditional commitments, and makes the loan to the buyer, whose eligibility and payments are based on income and family size.

A Positive Approach to Water

Community development requires a full complement of community facilities, including transportation, communications, electricity, gas, adequate water and waste disposal systems.

One of rural America's major handicaps has been its deficiency in clean, abundant water and effective waste disposal. Decent homes and thriving towns cannot exist where raw sewage flows in the open and water is scarce or unfit to drink.

Installation of a modern water system recreates people's confidence and promotes the growth of new industries.

During calendar 1971, the FHA community services loan program, emphasizing water and waste disposal system construction, was carried on at a pace previously unequalled in the Nation's history.

Through loans of $316 million and grants of $60 million, FHA financed more than 1,400 water and waste disposal systems. They will serve 1.3 million rural citizens. FHA has now financed more than 5,700 water and sewer systems which, when fully operational, will serve more than 5 million rural residents.

For many who lived for years without a good supply of water, a new age has arrived. No longer need they haul water or depend on cisterns, wells, springs, ponds, creeks, or rivers for their supply. No longer need they fear drought and extreme pollution.

FHA's water and sewer program received an important boost when President Nixon, as part of his "Salute to Agriculture," ordered that funds for community facilities loans be increased by $100 million during fiscal 1971, and that funds be increased for community facilities by $111 million for fiscal 1972. This raised the level of funding to $300 million, the highest in the program's history.

Community leadership and local involvement are evident in projects for water and sewer systems.

> In South Dakota, two projects, the Lake Andes water supply and the Platte Creek Irrigation Association project, are transforming the area. Irrigating the plateau overlooking the Missouri River had long been a seemingly impossible dream. Although the plateau has some of the best land in the world, there appeared to be no way to get water up to it.
>
> The cooperation of local people, FHA, and the Resource Conservation and Development program, made the impossible dream come true.
>
> At a total cost of over $200,000—about equally divided between an FHA loan and SCS cost sharing—three huge diesel engines, each capable of pumping 1,100 gallons of water per minute, were installed to deliver water to the plateau through a 14-inch steel pipe. Planners—and dreamers—now look forward to the day when the entire plateau will be irrigated.

A Tennessee family lived here before moving into their new home below.

This house built with an FHA housing loan cost $10,050. Annual payments total $556.

Getting water the hard way.

Washing up can be fun.

The new water and irrigation system is part of the promotion of South Dakota's agriculture, industrial development, and tourism—made possible through the cooperation of local people assisted by government.

Extension workers helped plan a house-to-house solid waste collection for every household in St. Clair County, Ala. This proposed rural countywide house-to-house collection system will be the first of its kind in the Nation to serve a predominantly rural county. The county Extension chairman is the executive secretary of the St. Clair County Resource Development Committee.

Local cooperation in improving water, sewer, and solid waste disposal systems is often assisted by Extension workers. During the year Extension helped conduct more than 650 surveys and feasibility studies on water and waste disposal.

CREATING JOB OPPORTUNITIES

A vital factor in the rural development picture is the establishment of new income and job producing industries.

Extension assisted more than 1,700 local, county, and State groups interested in business and industrial development. Feasibility studies were conducted for 575 projects during the year.

Extension was one of several USDA agencies helping the Hillsdale County, Mich., Redevelopment Committee reverse its declining economic situation.

Industries, which had been closing down and leaving prior to the Hillsdale development effort, have committed themselves to building new plants and plant additions calling for an investment in land and buildings totaling more than $6.3 million. This expansion is well on the way to creating the 1,438 new jobs Hillsdale County leaders estimate they will need to provide an adequate job base in 1975.

Cofield, N.C., is one of many communities across the Nation with a new economic outlook developed through assistance in overall planning, a careful study of problems, some outside help, and local determination. Progress has been made in six distinct areas. The community was incorporated, a water system was installed, garbage pickup service was initiated, a 9-acre recreation tract was purchased, a 4-H Club was organized, and a home improvement, beautification, and employment program was promoted.

With an average family income of $700 and a population 90 percent black, Cofield's chances of "coming back" seemed poor when the development program started.

"Getting a water system really sparked the community," the Hertford County Extension agent says. "The people now feel they can do almost anything."

Researching New Opportunities

The feasibility of new enterprises often depends on the economics and market acceptance of new products. In the past year, ERS engaged in researching two products, pinto beans and catfish, which have potential for developing new opportunities in rural America.

ERS participated with ARS, the Colorado Agricultural Experiment Station, and the Four Corners Economic Development Commission in determining the feasibility of a bean processing plant as part of a rural area development plan. Evaluation of the market potentials for new quick cooking bean products indicates that a sizeable potential market exists for dry pinto bean powder in the institutional food service market. Limited market acceptance was reported for frozen and refrigerated beans. The study provides a partial base for deciding whether it is feasible to establish a pinto bean processing plant in the depressed Four Corners region.

Production of catfish, as a new enterprise for rural areas, has received considerable attention in recent years. In addition to finding solutions for many production and processing problems information was urgently needed on market demand. To provide some guidelines in this area, a study of consumer acceptance of catfish using household panels in four major regions of the country was undertaken. The results have been tabulated by region and are being analyzed according to socioeconomic characteristics to indicate what consumers think of catfish and whether the presently low per capita consumption can be increased.

Cooperatives Stimulate Rural Economy

Cooperatives are increasingly active in improving income and work opportunities, especially for farm people in rural America.

In recent years between 600 and 700 cooperatives, many of them consisting of low-resource farmers and rural residents of all ethnic groups, have been formed annually in the United States.

A recent FCS study of 20 new marketing and 28 new machinery cooperatives in 15 States shows average additional income of $123 by members of marketing co-ops and $308 for members of machinery co-ops.

Through a contract with the North Carolina Rural Fund for Development, an FCS staff member provides full-time technical assistance to more than 100 low-income farmers in the Albemarle Cooperative Association now producing feeder pigs. Through better marketing and quality feeder pig production, members expect to increase their family income by an average of $1,000 per year.

The Tri-County Farmers Association, a vegetable marketing cooperative at Whiteville, N.C., has added more than $400 a year to the income of its members.

Lost City Marketing Association, Hulbert, Okla., consisting of 140 members, 92 of them Indian, handles feeder pigs and feed, arranges for breeding stock, fencing and farrowing house materials, and credit. Begun in 1969, the cooperative's volume of sales that year totaled $22,000. For the first 9 months of 1971, sales were $313,365. The cooperative now markets more than 600 feeder pigs per week and generally returns $3 to $5 per head to producers above what they could have received from other local auctions.

During fiscal year 1971, the Farmer Cooperative Service provided technical assistance to 110 emerging agricultural and other rural cooperatives involving more than 55,000 persons.

Electricity and Telephones

Electric and telephone systems financed by the Rural Electrification Administration have matured as local business enterprises, and are taking leading roles in shaping the future of rural America. The progress achieved in rural electrification and telephony during 1971 provides a springboard for greater accomplishments during the decade of the seventies.

Fiscal 1971 was the most successful and active year in REA's 36-year loan program history. In the electric program, the agency made 332 loans, the largest number since 1958, for a total of $361.8 million. These loans will finance construction to serve about 200,000 new consumers, and will provide loan and seed money for nearly 1 million kilowatts of generating capacity. The loans make available $193.6 million for distribution purposes and $168.2 million for generation and transmission. A record $412 million was advanced in the electric program, and $137.5 million was advanced in the telephone program.

During the year, REA-financed systems helped to create at least 38,750 new jobs in rural areas through 765 rural development projects in agriculture, forestry, recreation, community facilities, manufacturing and service.

REA electric borrowers built more than 25,000 miles of line during 1971—enough to encircle the earth—and added 245,000 consumers, the greatest yearly increase since 1950. These rural utilities now serve 6.4 million meters, 1.6 million more than in 1961, reaching almost 21 million farm and rural people in 2,700 counties of 46 States.

In the REA telephone loan program, 100,000 subscribers are connected to lines of borrower systems each year. These utilities provide service to 2.3 million subscribers over 554,200 route miles of line. During fiscal 1971, the agency approved 161 telephone loans for $125 million, the full amount apportioned by the Office of Management and Budget.

Growth and expansion in both electric and telephone loan programs have created a crucial need for supplemental financing. The National Rural Utilities Cooperative Finance Corporation (CFC), established by REA-financed electric systems to bring in needed outside financing, made its first concurrent loans with REA in February 1971, at first providing 10 percent, but recently funding as much as 20 percent of the total loans.

The Rural Telephone Bank became a reality when the bill was passed by Congress and signed by President Nixon in ceremonies at the White House May 7, 1971. The President appointed 11 of the 13-member board of directors for the bank, and REA Administrator Hamil, Governor of the new lending institution, called the board for its first meeting October 14. Two board members are named by law.

Rural people of many States will benefit from the new activity in the electric generation and transmission program. The Hoosier Energy Division, power supply facility in Indiana, was returned by REA to local ownership, ending long legal disputes between the rural cooperatives and the investor-owned companies. Some 95,000 rural consumer-members of 17 distribution cooperatives in a 47-county area of Indiana receive service through this facility.

In Ohio, REA made simultaneous "seed money" loans totaling $16,575,000 to 27 electric cooperatives to finance their participation in a 615,000-kilowatt generating unit of Buckeye Power, Inc. Approximately 600,000 people in Ohio's rural areas will benefit from this facility which will cost $170 million.

REA also provided $30,540,000 in loans to two Iowa cooperatives to finance their participation with a power company in a 550,000-kilowatt nuclear generating plant.

The agency took action to insure that generation and transmission facilities it finances comply with existing environmental guidelines.

> The REA-financed Gate City Electric Cooperative, Childress, Texas, has led the Four Winds Industrial Foundation into programs designed to renew and revitalize business, and improve living conditions, in a four-county area of North Texas. The Foundation developed an industrial park, obtained loans, grants, and subsidies for projects including housing, water, sewer, and recreational facilities. It has published a brochure describing resources and assets of the area. Three new water systems are already in operation. Work such as this exemplifies the type of local development projects in which REA-financed systems exercise leadership in bringing about an improved quality of life for people in rural areas.

CONSERVATION'S ROLE IN RURAL DEVELOPMENT

Since forests make up one-third of the land area of the United States, they obviously provide an important part of the natural resource base of many rural communities. Forest Service programs, consequently, have important effects on these communities. The Service cooperates with State foresters in all 50 States in assisting and promoting rural development.

Cooperative Forest Management

The Federal-State Cooperative Forest Management Program provides technical assistance for 4 million nonindustrial private landowners who own nearly 60 percent of all the commercial forest land in the United States. During fiscal year 1971, 878 Federal and State foresters helped 127,828 forest owners in their management of 7.9 million acres of privately owned timber. This assistance aids in maintaining a stable resource base for forest industries, a higher quality natural environment, and also increases income for forest owners and users, which is reflected in the economic life of nearby communities.

Other Federal-State cooperative programs enable private landowners to obtain planting stock at nominal costs, control insects and diseases, protect against fire, and assist in the marketing of forest products.

Forest Product Industries

A new short-log processing system coupled with a computer program for process control promises to provide a more efficient and profitable method of obtaining short length lumber products and pulp chips from very low-grade hardwood logs. A mill design was developed and economic analyses were made to show how these techniques can be used to convert low-grade oak and hickory trees into pallet products. A new technique provides a sound basis for establishing relatively small sawmill operations in areas that have large quantities of low-grade logs.

> A process developed by the Tennessee Valley Authority for crushing low-quality hardwood logs and branches into strands has been used by the Forest Service to produce a unique particleboard. Possible large-volume uses for the particleboard include wall sheathing and interior paneling. The new product requires only half as much phenolic resin as conventional particleboard. Economies of the crushing techniques, coupled with the wood products now visualized, could lead to the establishment of manufacturing plants to utilize the abundant low-grade hardwoods found in eastern rural areas.

The Forest Service also provides technical assistance in developing wood-using industries.

A study of the feasibility of producing plywood in the Black Hills of South Dakota is now being completed. This study, at the request of the Western South Dakota Development Company, will show not only the economic feasibility of plywood manufacture, but also its economic and environmental impact on the entire area.

> Another Forest Service study has enabled a manufacturer to install the first large shake plant in Oregon. This study also led to approval of a uniform building code. Forest Service efforts in arranging for approved inspection and certification service have enabled the manufacturer to expand his

marketing area from local sales to all the western United States.

Promotion efforts are being made to attract an industry to harvest and process pine poles and posts from young pine plantations on the Shawnee National Forest in Illinois. Thinnings from pine plantations will produce enough materials to support a new industry.

Research on growth potentials of the softwood plywood industry using linear programming analysis indicates that the Southern States are likely to provide more than one-third of the Nation's plywood in the 1980's. Important factors in this analysis included competition with other industries and relative costs of manufacturing and shipment to national markets.

Research on forestry cooperatives has provided guidelines that can aid timber owners and operators in rural areas in organizing and operating forestry cooperatives. Group enterprises can provide more efficient harvesting, processing, and marketing of logs, pulpwood, and other forest products.

"A Guide of Medicinal Plants of Appalachia," a manual for collectors of natural plant materials for medicine, has been released by the Forest Service. A recent survey showed that 25 percent of new prescriptions for drugs written in the United States were made from natural plant materials. The principal American source of these materials is Appalachia, and medicinal plant collecting is a source of income for many Appalachian residents.

Early Planning for Towns in Projected Recreation Areas

In the current development of the Blanchard Springs Caverns area in the Ozark National Forest, projected visitation indicated that hundreds of thousands of visitors would descend upon Mountain View and the rest of Stone County, Ark., which is currently economically depressed, on their way to and from the caverns. The Forest Service helped to establish an orderly plan of development for community services and facilities. As a result, the activities of county, State, and Federal agencies, economic development districts, and Rural Development personnel were coordinated to bring technical services and support to the town of Mountain View and Stone County in their efforts to prepare for the tremendous visitation they will receive. Such an approach will be increasingly used in the Forest Service planning process of interpretive areas.

Timber harvesting is an important source of income in parts of rural America. Receipts from National Forest timber sales and other land uses during calendar year 1971 totaled $289.5 million. Receipts from the sale of National Forest timber alone amounted to $269.6 million. Receipts from the sale of National Forest timber are turned over to the U. S. Treasury, with one-fourth of the total returned directly to the States and allocated for schools and roads in the counties where the National Forests are located. About $57 million was returned to the States as their share of fiscal year 1971 receipts from all National Forest uses, including timber.

Some 18,000 farming and ranching operations depend on National Forest System ranges to varying degrees. All are family-type operations—most of them small—and they provide the basic economic framework for many small rural communities throughout the country. These operations grossed about $170 million from the sale of livestock products in 1971. This generated an estimated $300 million of household income in rural communities.

The revitalization of rural America continues to be an important objective of Soil Conservation Service programs. Nowhere is this more evident than in the rapidly growing number and effectiveness of Resource Conservation and Development Projects administered by SCS.

Resource Conservation and Development Projects

The objective of RC&D projects is to improve the use of an area's natural resources and thus raise the economic and social level of the people living there. Each RC&D project covers an area where the potential is high for boosting income and increasing community facilities.

For example, the Little Colorado River Plateau Project, with headquarters in Holbrook, Ariz., includes the Hopi Indian Reservation, the Navajo Indian Reservation (Ariz.), and two northeastern Arizona counties, a total of 16.2 million acres. Project goals include stabilizing the livestock industry through improved range vegetative cover, developing water and timber resources, improving sewage treatment and disposal, introducing specialty crops, improving transportation facilities, establishing markets for the area's farm products, and developing new recreational areas. Sponsors include the Hopi and Navajo tribal councils.

In September 1971, 20 new RC&D projects, covering nearly 72 million acres in 133 counties in 21 States, were authorized for planning assistance from the Department. This addition brought the number of projects underway across the country to 98, covering 372.5 million acres.

The RC&D program attacks a wide variety of problems in agriculture, forestry, industry, employment, and community facilities.

Thus, the *Hull-York Lakeland RC&D Project* embraces 11 counties in north central Tennessee, an area with a history of mismanaged forests. The project helped create the Appalachian Forestry Association, whose goal is forest improvement.

The Upper Cumberland Recreation and Tourist Association is a spinoff of this RC&D project. Because many acres of farmland were being absorbed by a new lake, this association began to promote the area's lakes and mountains for recreation use.

The *Mountain-Dominion RC&D Project* assisted the Southern West Virginia Regional Health Council in establishing three demonstration sanitary landfills in southern West Virginia, where none existed before. An average of 100 tons of solid waste per day is delivered to the Mercer County landfill and there has been a noticeable decrease in roadside dumping in Mercer County.

This project is also helping to implement a clean-stream program along East River. In 3 years, two tributary streams have been cleared of trash, and fish habitat has been improved. Techniques originating in the project have been used by the West Virginia Department of Natural Resources in 40 of the State's 55 counties.

The *Hohokam RC&D Project* in central and southeast Arizona requested assistance for Allenville, a small black community southwest of Phoenix, characterized by substandard housing, poor quality and low-volume domestic water supply, poor public roads, poor recreation areas, and no day-care center for working mothers.

> Allenville's main street is now paved, a day-care center has been built and staffed, and a new domestic water well drilled. New homes are under construction. Allenville Park has been rough-leveled, an irrigation pump and delivery pipeline installed, and the park will be planted with trees, shrubs, and grasses, mostly donated by local nurserymen.

In the *Cherokee Hills RC&D Project* in northeast Oklahoma, people are raising their income capabilities through job training. In 3 years, the training program has given vocational skills to about 700 persons, 280 of them Cherokee Indians, and half of the male participants military veterans. Participants are trained in operating bulldozers, servicing farm machinery, welding, machine tool operation, stenography, and repairing small motors, tractors, and implements.

> Robert Hogner, a Cherokee Indian from Tahlequah, married and father of four children, is now a skilled welder. "Before I took the welding course," he said, "I was out of work much of the time, and when I was working it was usually as a dishwasher. I make more than twice as much money with this job as I ever did before."

MANPOWER DEVELOPMENT

Nationally, Extension workers during the year assisted in 1,477 manpower training projects, helped 1,378 groups interested in manpower development, and aided in conducting 300 surveys and feasibility studies related to manpower development.

> An example of this work is the vocational training courses conducted in the Lincoln Hills area of Indiana. Since the training was initiated in 1969, more than 800 local people have participated in the courses. The courses are selected and offered on the basis of a survey conducted by Extension

> through the local human resource advisory committee of local citizens. The area Extension agent works with this local committee.

Extension plays a key role in the activities of the 16 Concerted Services in Training and Education pilot programs now operating in 13 States. CSTE objectives are to improve the level of living in selected small towns and rural areas by increasing employee skills and employment opportunities. Many pilot project coordinators are former Extension workers, some are administered by the State Extension Service, and all are provided liaison.

Examples of programs designed specifically to benefit low-income and minority groups are the training and educational programs conducted in North Carolina and New Mexico. These programs focus particularly on the development of marketable skills by the unemployed and underemployed; they involve determining the need for training, arranging for services and facilities, recruiting trainees, and locating job opportunities.

Many trainees are now filling jobs in business, industry, and service trades that were not previously available to them.

Involving Youth in Rural Development

Data submitted by the State Cooperative Extension Services indicate that 235,812 youth were involved in 4-H community studies, development, and service projects in 1971. More than 136,000 youth were enrolled in special citizenship programs including "know your government" and public affairs education.

Increased involvement of youth with audits in community development is identified in the overall policy directions for youth programs for the decade of the seventies.

> The Virginia Cooperative Extension Service has made rapid progress in developing and testing a major new program for involving youth in community development. The special project was funded by USDA Extension Service in the fall of 1970. This project enabled Virginia to develop program guidelines and leader materials. Testing of the materials began in 16 counties during 1971 and preliminary observations indicate rapid and enthusiastic acceptance by both the youth and the adult leaders involved.
>
> Nearly 600 youth participated, in addition to the effective involvement of college students in working with community leaders, volunteers, and 4-H participants. Results of the effort as well as materials will be made available to all States for use in 1972.

The Farmers Home Administration, in cooperation with the Future Farmers of America, initiated a project to engage the efforts and enthusiasm of 450,000 young Americans in rural development.

Called the "Build Our American Communities" (BOAC) program, it is designed to help young people become knowledgeable community leaders who understand the principles of leadership as well as the interrelationship of local, State, national, and world development problems.

Farmers Home prepared, as a BOAC guide, a series of broad classroom study plans, and the vocational-agribusiness instructors (FFA advisers) in more than 8,000 schools put them to use.

BOAC has received support from the local FFA chapters and from local, State, and national governments, including a meeting with President Nixon who heartily endorsed the program.

A spirited competition has developed among FFA chapters which vie for local and State honors in their attempts to better their communities. Governors in more than 30 States have presented citations to local chapters in recognition of their constructive efforts during the first year of the BOAC program.

> The FFA Chapter from Berrien, Georgia, received a national citation for its outstanding performance in the BOAC program. Under the slogan, "Build A Better Berrien County," the local FFA chapter enlisted support of 14 adult civic and farm organizations and service clubs. The first results included landscaping work by FFA members to beautify parks, school grounds and the business section of Nashville, Georgia, the county seat. FFA members, working with machinery loaned by city officials, tore down and cleaned up unsightly old buildings in the town. They also signed up farmers all across the county in a pledge to help improve the appearance of the countryside.

Special Manpower Training

As of June 1971, the Forest Service in cooperation with other Federal agencies, had about 11,000 individuals enrolled in nonresidential training programs for primarily rural disadvantaged people. Trainees acquire skills through training projects designed by the Forest Service and State forestry agencies. While performing this work-training activity, the trainee is assisting in accomplishing much needed conservation work on public lands.

Under the Job Corps program, 8,000 disadvantaged youths were provided education, vocational training, and social living skills at 20 civilian conservation centers administered by the Forest Service.

The Youth Conservation Corps pilot program, initiated during the summer of 1971, proved highly successful. About 2,700 young men and women, ages 15 through 18, were employed on 64 projects in 37 States, the District of Columbia, and American Samoa. Of this number, 1,384 were employed on 34 projects administered by the Forest Service.

The young people performed conservation work and environmental improvement on public lands, received learning experience in natural resource conservation, and developed a greater understanding of social needs and problems by working, learning, and living with fellow corps members from various social, economic, and ethnic backgrounds.

Of the 25 closed civilian conservation centers formerly operated by the Forest Service up to 1969, most are being utilized by State, city or community bodies for educational, correctional, or other socially useful programs. Users are operating most of these centers under Forest Service special use permits.

Facilities and land at several of these closed centers have been transferred to States and community action bodies through donation procedures as a result of our reporting these through excess channels with resultant donation assignment by the Department of Health, Education, and Welfare to the user at no cost. The socially oriented uses of these closed facilities should stimulate the growth of several rural communities.

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The message to Congress on rural development of February 1, 1972, puts the problem in sound perspective.

"All Americans have a high stake in rural development. For the problems which many rural areas are now experiencing are directly linked to those of our cities and suburbs. Changing patterns of life in rural America have changed the pattern of life in all of America."

Our goal must be to achieve balanced national growth in population, in economic activity, in the attainment of life's satisfactions as the United States moves toward the 21st century. To achieve this goal increased vitality in rural America is essential. In all too many ways the benefits of technological, economic, and social progress have passed by a large proportion of our people on farms and in rural towns and cities.

But progress is indeed being made. Proportionate to their numbers, people in rural America are still twice as likely to have poverty level incomes as those in the rest of the country—but the rate of poverty is now being reduced twice as fast in rural as in urban America.

Although rural America still contains about two-thirds of the Nation's inadequate housing, the ratio of inadequate to adequate rural housing units has been reduced in recent years from one in three to one in seven.

The median years of school completed by persons 25 to 29 years of age is now about the same in metropolitan and in nonmetropolitan areas.

Manufacturing employment is expanding more rapidly in rural areas than in the large cities.

Our progress is encouraging. But progress is never something to rest on. It is most significant only when it is something to build on. The biggest progress is still in the future, still to be achieved.

TOWARD A QUALITY ENVIRONMENT

"The forces which threaten our environment will not wait while we procrastinate."

Polluted rivers and lakes, smog discomfort, pesticide residues that threaten wildlife and possibly human health, and a generally junked up landscape, have made the environment a top national concern.

In discussing this immensely important problem and the role of American agriculture and the USDA, we can profitably begin by examining this question: How did the present situation come to be?

Prior to Dust Bowl problems of the 1930's, relatively few Americans were concerned about the environment. Then, however, depression, drought, and the Dust Bowl set the stage for emergency and long-range programs aimed at land reclamation, improved farming, and watershed development.

While the program carried out by such agencies as the Civilian Conservation Corps, the Soil Conservation Service, and the Tennessee Valley Authority did not immediately solve the long-smoldering problems, they did open the way to a successful attack on the misuse of America's natural resources.

About the time that the Nation was beginning to take effective action against erosion and mismanagement of the land, another problem was being born.

After World War II, factories that had been turning out DDT for the military began to produce it for farmers. Until about 1945, synthetic organic chemicals accounted for only about 10 percent of the total dollar sales of farm pesticide chemicals. Today, synthetic organic pesticides account for more than 90 percent of the pesticides produced.

The use of fungicides and insecticides increased. Herbicide sales climbed even faster. And new chemical fertilizers also found expanding markets.

The problems resulting from the extensive use of these chemicals are well known today: Increasing resistance of insects to pesticides, chemical buildups in streams and the soil, damage to wildlife and possibly to humans.

The salting up of soils through irrigation is another worrisome area with many imponderables. Without adequate drainage to carry irrigation water below the plants' root system, salt content in the soil builds up and crop yeilds suffer. And when drainage is sufficient, there may be an increase in salinity levels in streams and other water bodies.

Although the erosion of soil by water is now less damaging than it was before the widespread use of conservation practices, according to one estimate 3 billion tons of sediment are deposited each year in reservoirs and valleys, and another 1 billion tons are carried by rivers to the ocean.

About 1½ million acres have been dropping out of the Nation's cropland base annually.

Between 1945 and 1965, 54 million acres were abandoned or shifted to noncrop uses. But for every 2 acres that went out, nearly one acre of new cropland was developed, bringing the annual reduction to roughly 1.4 million acres.

Much of the new land, however, is more productive than that abandoned. And production increases per acre since the 1940's have more than offset the shrinkage in farmland.

Production gains have also been outstripping our rate of population growth, which is currently around 1 percent a year. While population from 1950 to 1970 expanded by one-third, crop production rose by more than one-half, and per capita agricultural output increased by 6 percent.

About one-fifth, or 430 million acres, of the Nation's land area is currently used for crops. Another 640 million acres are grassland pasture and rangeland, although some of this has very low carrying capacity for livestock.

Recent trends in land use indicate that urbanization favors the use of the better farmland. Moreover, a sizable chunk of better quality land is located in counties within Standard Metropolitan Statistical Areas (SMSA's)—those counties in or near a city or community with at least 50,000 people.

Our land resources appear adequate to provide ample food supply for many years to come. Certain developments, however, could alter the outlook.

Past increases in per acre yields are attributed to improved varieties, increased use of fertilizer and pesticides, the elimination of less productive land from cropping, and land improvement practices such as drainage and irrigation.

Future per acre production gains of, say, 2 percent per year would depend to a considerable degree on continuing increases in uses of farm chemicals on land. Should it become necessary to curtail usage of chemicals in the absence of effective substitutes, more land would be required to achieve a given level of production.

As for livestock, the possibility of further sharp increases in demand for beef raises the question whether pasture and rangeland would be sufficient to carry all the cattle needed.

During 1971 an increasing number of rural and suburban landowners and units of government, struggling with the problems of rapid urban and community growth and land use change, requested technical assistance from the Soil Conservation Service.

Conservation Districts

SCS continued to provide technical assistance to individual landowners and users cooperating with the 3,027 soil and water conservation districts throughout the country. The agency also sharply increased help to groups and organizations ranging from two or three landowners to many landowners forming large single-interest and multi-interest associations.

At the end of fiscal 1971, more than 2.2 million cooperators in conservation districts were applying and maintaining soil and water conservation practices on 766.5 million acres.

During the year SCS helped prepare nearly 70,000 conservation plans covering more than 28.7 million acres and helped revise 32,393 plans covering more than 20.3 million acres. More than 586 million acres of private land in the United States are now covered by conservation plans that insure resource protection and proper land use.

About 22,800 units of State and local government received help from SCS in 1971. The agency provided 10,931 resource inventories and evaluations to planning commissions or other agencies of local or State government. It also made field investigations and recommendations on land use and treatment of proposed sites for 2,042 public facilities, including schools, hospitals, sanitary landfills, transportation facilities, recreation areas, and water and sewer facilities.

In working to develop sound land use and treatment ordinances, local and State governments issued or enacted 468 land use regulations, zoning ordinances, sanitary codes, and building codes or standards, using soil surveys and other technical information provided by SCS.

Soil Surveys

Soil surveys and soil maps are used not only by farmers but by urban planners, developers, engineers, and others to avoid costly mistakes which can result from building houses, schools, factories, and roads on soils unable to sustain these purposes.

During fiscal 1971, 60 soil surveys were sent to the printers, the most ever in any one year.

Soil surveys were completed on 37,973,001 acres during the year. Soil surveys suitable for operational planning have now been completed for 778,331,447 acres, about 41 percent of the U.S. land planned for mapping.

Snow Surveys

The Snow Survey and Water Supply Forecasting Program continued to grow in popularity in the western States. Testifying to the worth of this cooperative effort is the fact that 37 percent of the 1971 program was paid for by cooperating agencies.

In addition to the long-time uses of snow survey data, such as predicting the supply of water for irrigation during the coming season, snow surveys are now being put to new uses. These include evaluating the potential for winter sports areas and predicting the extent of snow loads which must be withstood by various structures.

Snow survey data are also used in water management for pollution control. With knowledge of predicted rates of streamflow available, the assimilative capacity of streams can also be predicted and allowable rates of waste discharges can be determined in advance.

Monitoring

In response to accelerated planning at local and State levels of government—especially in areas of critical environmental concern, high-intensity land use, or rapid change in land use—SCS continued to broaden its monitoring, survey inventory, and interpretation capabilities.

> As set forth in the SCS long-range plan, remote sensing developments will become increasingly important in resource monitoring and surveying responsibilities. The Department is watching and evaluating developments in remote sensing and is planning to participate modestly in testing selected outputs from the first Earth Resources Technology Satellite (ERTS) scheduled for launching by NASA during the spring of 1972.

Long-Range Plan

Among the year's significant developments was the completion by SCS of a long-range plan—"Soil and Water Conservation for a Better America"—which incorporates basic human and environmental considerations into the technical scheme of soil and water conservation science.

The plan is useful not only to those in the Federal Government who have responsibilities in the environmental field but also to soil conservation districts, State resource agencies, and many private conservation organizations. Its framework is applicable to any part of the country. What will vary from area to area, and community to community, is the mix and relative importance of specific needs and goals.

Great Plains Program

The severe drought which struck the Southwest during 1971, causing severe damage to farms and ranches in the Great Plains region, underscored the high priority given by the Department to the Great Plains Program.

Wind erosion in the Great Plains reached a 14-year high in 1971. About 4.7 million acres suffered erosion damage, the worst year since 1956-57 when 10.3 million acres underwent extensive soil movement. In contrast, only 995,150 acres were damaged in 1968-69, the alltime low. A Soil Conservation Service survey showed 2.7 million acres of land damage in west Texas alone during 1971. Most of the damage occurred on lands insufficiently protected by the residues of the previous year's crops. Emergency tillage was effectively used to protect 3.9 million acres.

Through long-term contracts under the Great Plains Program, farmers and ranchers apply needed conservation treatment on their land in the 453 designated Great Plains counties.

Priority is given to cropland that is unsuited for sustained cultivation but is still used for that purpose. About 20 percent of all cropland in Great Plains Conservation Program contracts is planned for conversion to rangelands.

In 1971, 2,368 farmers and ranchers placed more than 4 million acres under Great Plains Program contracts. More than 40,000 farmers and ranchers now either have completed or have underway contracts for conservation treatment of more than 72 million acres.

WATERSHED PROTECTION AND FLOOD PREVENTION

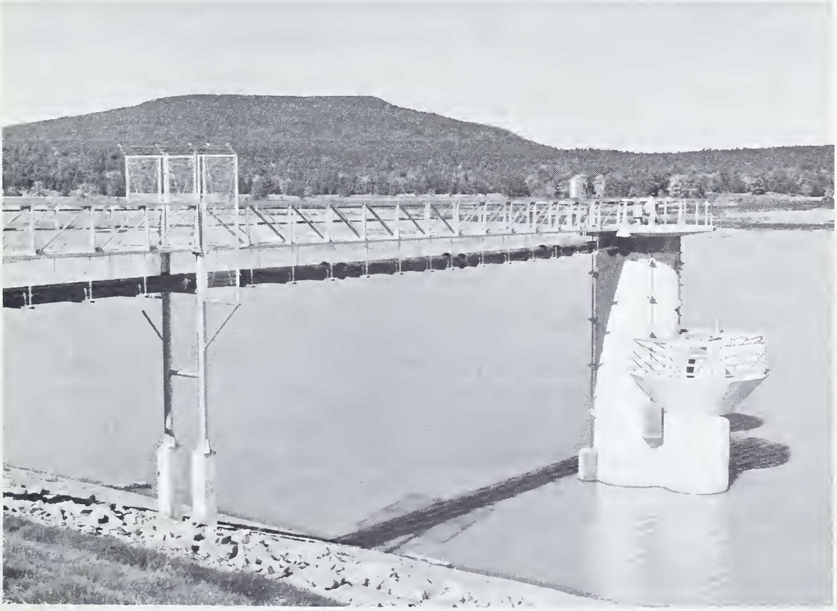
The watershed program, one of the early congressional efforts in environmental improvement, was designed originally to help local sponsoring groups control erosion, reduce sediment, and prevent floods. Water supply, recreation, fish and wildlife and other multiple-purpose features are added benefits that help meet broad and positive community needs.

As of December 31, 1971, Federal assistance in construction or preconstruction engineering work had been furnished to sponsors of 1,051 projects. Initial agreements for construction were signed in calendar year 1971 for 38 projects, bringing the cumulative total to 776 projects that have entered the construction stage. Sponsors of 323 of these projects had completed the installation of all construction measures by the end of 1971 and both construction and related land-treatment work had been completed in 306 projects.

Local sponsors submitted 85 new applications for assistance during the year. Planning assistance has been authorized for a total of 1,638 projects over the years. By December 31, 1971, there was a backlog of 1,303 unserviced applications for planning assistance.

The multiple-purpose concept is strongly reflected in watershed project planning. Of the 1,051 plans approved for operations as of December 31, 1971, 58.6 percent have included more than one purpose.

This farm pond provides water for livestock, fire protection, recreation, and natural beauty.



This multi-purpose reservoir prevents flooding and assures water supply.

* * *

In the Brule Creek watershed of South Dakota, six of the 17 proposed floodwater-retarding structures and three grade stabilization structures have been completed. Although only 12 square miles are now controlled by structures, a member of the watershed board of managers said, "Already we can see the difference; each additional structure reduces the flooding. I used to lose alfalfa every year from flooding; I haven't lost any now for 2 years."

The sediment pools of three of the floodwater-retarding structures are being used for livestock water and recreation. The floodwater-retarding structure in central Union County is providing an excellent recreation outlet for swimmers, fishermen, and duck and goose hunters.

* * *

Life in the borough of Wellsboro in Tioga County, Pa., has improved markedly since the completion of three flood prevention structures and associated recreation facilities on Marsh Creek. While virtually eliminating all flood damage in Wellsboro and vicinity—since 1967 the project has saved Wellsboro from four damaging floods—the dam also provides the community with water and outdoor recreation. A 60-acre lake, only 5 minutes from Wellsboro, provides opportunities for fishing, boating, and picnic facilities for thousands of visitors annually.

Between the time the project was planned and shortly after its completion, the following changes occurred: Wellsboro voted to purchase the local water company; new street lights were installed and the main street was completely resurfaced; several companies expanded their facilities and increased job opportunities; Wellsboro became the center of a growing tourist area.

ASCS Conservation Work

ASCS continued to stress public benefit (along with farm benefit) in its conservation and related environmental improvement programs. Much of this public-benefit work—including obvious environmental improvement projects such as water, air, and land pollution abatement and tree planting—is done through the Rural Environmental Assistance Program (REAP).

In 1971 REAP put its priorities on *enduring* conservation practices which result in erosion control, preventing siltation, preventing and abating livestock waste pollution, and keeping pesticide residues and other agricultural chemicals from polluting the environment. REAP encourages farmers to undertake needed projects they would not carry out without cost-sharing assistance.

The following examples illustrate the new REAP emphasis:

> Thunderbird Lake is a man-made lake created about 10 years ago in central Oklahoma. It provides city water and recreational opportunities for over 100,000 people in Norman, Midwest City, and Del City. But it has been plagued by siltation caused by construction and agricultural practices, a problem compounded by easily eroded soil in the Little River watershed. REAP funds are building detention dams which will help correct and abate future siltation of Thunderbird Lake.
>
> People who flock to Lake Herman State Park in eastern South Dakota and residents whose lakefront homes dot the privately owned shoreline opposite the park are benefiting from conservation measures carried out by farmers. Several years ago, Lake Herman became polluted and had silt deposits up to seven feet. The silt is now being dredged out and conservation cost-sharing work by farmers in the watershed area is preventing recurrence of siltation and runoff of chemicals into streams that feed the lake.

Forestry Projects

Tree planting and other forestry projects offering various environmental improvement benefits are being emphasized through REAP. The portion of all cost-shares used for forestry practices increased from 2.8 percent in 1970 to 5.2 percent in 1971. Three States have increased their expenditure percentages for such practices to 25 percent or more. Forestry practices also involve youth in environmental improvement work. In Virginia, 4-H Club and Future Farmers of America members in one county have planted over half a million trees in the past 5 years.

Pollution Abatement

Pollution abatement practices authorized specifically for the first time in 1970 received special emphasis in 1971. Cost-shares for pollution abatement practices increased from 0.85 of one percent of all cost-shares under the 1970 program, to 6.52 percent under the 1971 program. Among the States which have shifted a substantial portion of their cost-sharing funds to pollution abatement practices are California, Idaho, Indiana, Iowa, Mississippi, Ohio, Utah, Washington, and Wisconsin.

In Florida, where dairymen face typical problems of larger and more concentrated herds, spread of urban development, and increasing public concern about the environment, livestock waste disposal is increasingly critical. With the incentive of REAP cost-sharing, 47 dairymen participated in establishing lagoons, meeting Federal and State specifications, where bacterial action breaks down the waste material before it flows or is pumped out on the pastures as a fertilizer. During the first year of operation, these lagoons helped control over 382,000 tons of waste from 29,406 animal units.

Water Bank Program

Beginning in 1972, the Department will operate a water bank program at the funding level of $10 million as authorized by Congress. The major purpose of the program will be to encourage farmers to help preserve, restore, and improve the migratory waterfowl producing wetlands of the Nation. Farmer-elected committees of the Agricultural Stabilization and Conservation Service will administer the program. Planning assistance and technical service will be provided by the Soil Conservation Service in cooperation with the soil and water conservation district. There will also be consultation and close cooperation with State and U.S. Department of the Interior agencies.

Program funds will be available until committed and expended under 10-year agreements with owners and operators of eligible wetlands in important migratory waterfowl nesting and breeding areas.

PROTECTING FORESTS AND WOODLANDS

The USDA's Forest Service has the primary responsibility for guidance and leadership in conserving and managing U.S. forest resources. It directly administers 187 million acres of federally owned forests in the National Forest system, and it provides both direct and indirect services to States and individuals who own or control an even larger acreage of forested lands.

The National Forests provide five basic resources: timber, water, outdoor recreation, forage, and wildlife.

Timber

About one-fourth of all timber harvested in the United States comes from the National Forests—10.3 billion board feet in fiscal year 1971. Private companies cut the timber under contract with the Forest Service and close supervision by Forest Service personnel.

To replace timber harvested, 307,745 acres of National Forest lands were planted and seeded to trees during this period. About 92.5 million tree seedlings were produced for planting on these lands. On State and private forest lands, an estimated 1.3 million acres were reforested under the Cooperative Forest Tree Seedlings Production Procurement and Distribution Program. Tree planting in the United States is proceeding at a fairly constant rate of about 1 billion trees per year.

Fire Control

The burned area within the National Forest protection area during calendar year 1971 totaled about 237,000 acres, compared with 520,000 acres in 1970, an average of about 273,000 acres during the previous 5 years. Careful advance planning and aggressive attack by fire control forces keep damage down.

Through the Cooperative Forest Fire Control Program, we continued the steady increase and improvement in organized protection of non-Federal forests. Some 520 million acres of the 566 million acres needing organized protection in 1970 are now under the program.

Nation's Timber Inventoried

A new look at trends in timber supplies and demands is needed to help determine how the Nation's expanding markets for forest products and other forest land uses can best be met.

A new appraisal of the Nation's timber situation and outlook for the future is underway. It will, in effect, update two earlier studies on the subject—Timber Resource Review of 1952 and Timber Trends in the United States, 1962. Basic statistics are now available and a full analysis will be completed in 1972.

This study will provide a basis for judging the effectiveness of current forestry programs in the light of future needs.

Computer Cutting of Timber Tested

Lumber yield from small softwood sawlogs depends heavily upon the way the first saw cut is made. Scientists at the Forest Products Laboratory have developed a new system that utilizes electronic scanners and advanced computer technology to position each log for the critical first cut. For any given log, the yield difference between the best and the poorest opening face can be 20 percent or more. The new system should improve output on the average by at least 10 percent.

If laboratory tests can be duplicated in sawmills, this new cutting system could extend the Nation's timber supply considerably.

Water and the Forests

Adequate water is a vital ingredient of a quality environment. Every acre in the National Forest system is important to water production. About 90 percent of the western population depends on the National Forests for water.

The Forest Service uses federally approved water quality standards for all interstate and coastal streams in National Forests. A specialized system to check on National Forest land management and use activities as they affect quality of water is being maintained at numerous locations.

The Forest Service operates a nationwide flood and hazard warning system to warn residents on or adjacent to the National Forests of potential floods or other emergencies.

Recreation

Use of the National Forests for recreation continues to soar. Year after year, visitors come in record-breaking numbers to camp, drive, hunt, fish, picnic, ski, swim, canoe, hike, and take pictures.

Timber, grazing, and fishing are among the multiple uses of this Oregon forest.

Logs coming out of the forest as a boating enthusiast enters.

The National Forests now have facilities capable of accomodating nearly 1.4 million persons at one time. In line with the recent trend, recreation use of the National Forests in calendar year 1971 totaled 184 million visitor-days, compared with 173 million in 1970, 163 million in 1969, and about 157 million in 1968.

Protecting Wildlife

Forest Service has prepared a comprehensive listing of rare, endangered, and unique wildlife species on or adjacent to lands under Forest Service jurisdiction. The list includes 33 endangered, 25 rare, and 90 unique species. Management plans for their protection have been completed for 23 species and plans are being made for 56 others. Among the completed plans is one for the osprey, a unique species, on the Lassen National Forest in California where the largest known breeding area for this bird is found.

Study of Primitive Areas

During 1971, the Forest Service completed its review of 10 Primitive Areas for possible reclassification to wilderness. Reports have been sent to the President for his consideration and recommendation to Congress. About 1.4 million acres are involved. The remaining 11 Primitive Areas on the National Forests are also being studied.

Anti-Pollution Campaign

On September 15, 1971, "Woodsy Owl" became the Forest Service's nationwide symbol dedicated to combatting pollution and improving the environment of forests, woodlands, and open lands. Using the theme, "Give a Hoot! Don't Pollute," the campaign aims at environmental enhancement through reducing virtually all forms of pollution in outdoor areas of the United States. The goals include the protection of soil, vegetation, air, and water through thoughtful use; elimination of unnecessary noise; and personal responsibility for control of vandalism and destruction of the Nation's out-of-doors.

Significant progress toward antipollution goals will result from recent developments.

Tree use muffles noise.—The steady increase in community noise levels during the past 20 years sounds the alarm that a future noise problem, comparable to the current air pollution problem of large industrial centers, may be developing. A new report on noise abatement indicates that the din resulting from highway traffic, shopping centers, and the operations of heavy industry can be substantially reduced when they are screened by properly located tree and shrub plantations. The report provides information on proper placement, heights, and widths of tree and shrub belts to achieve a good filter against highway and industrial noises for parks, picnic areas, and housing developments.

Developing disease-resistant trees.—The best hope for protecting healthy forest stands is to develop trees with an inherent resistance to diseases. For example, control of fusiform rust through the growing of resistant pines is far more promising than through direct chemical control. Research is making significant strides toward identifying resistant species, clones, and hybrids for foresters who want to plant under a wide variety of soil, site, and rust-hazard conditions across the South.

One of the lessons already taught by forest research is that hastily formed schemes to improve environmental quality and natural beauty can backfire. For example, land leveling combined with soil fumigation in Douglas-fir nurseries has reduced soil organism populations, resulting in a deficiency in the mycorrhizal associations necessary for good survival in forest planting. Researchers in the Pacific Northwest now advocate extreme caution in the use of land management practices that fail to protect the natural soil flora and fauna.

Among the year's forest research developments was the establishment of 10 research natural areas totaling 12,562 acres where we will preserve important natural vegetation types in the United States. There are now 94 such areas in the growing system located in National Forests and National Grasslands in 29 States and Puerto Rico. These benchmarks of undisturbed and unique natural ecological conditions, occupying over 105,000 acres, enable researchers to compare natural with man-caused changes in the environment.

OVERCOMING ENVIRONMENTAL DEGRADATION

As the Report of the Secretary of Agriculture for 1970 pointed out, each person in our population, which has grown to 209 million, throws away on the average about 7 pounds of solid waste per day—or more than one ton per person per year. Pollution, therefore, is something to which all of us contribute and toward which all of us bear some responsibility.

A major objective of the USDA is to reduce pollution from agricultural sources through the development of new technology.

During the year, the Agricultural Research Service published a report on environmental problems facing the Nation and its research aimed at finding some of the solutions. We must protect land and water against washing soil, animal wastes, sewage, salinity, and agricultural chemicals. We must find ways to conserve plant nutrients in the soil and water; to recycle food processing wastes; and alternative methods to the use of persistent chemicals for pest control.

Reducing Pollution From Food Processing

During fiscal 1971, ARS scientists came up with additional improvements in food processing to reduce the amount of pollution dumped into streams. One is a method for making citrus puree using 90 percent of the whole fruit, so that less rind and pulp go into sewage. Another improvement, still in the testing stage, involves the use of liquid nitrogen, liquid air, or Freon 12 to quick-freeze the skins of tomatoes. Quick-thawing then leaves the skins loose-fitting for easy removal. This method cuts in half the amount of tomato flesh lost by conventional peeling.

Salt wastes from pickling plants pollute water. As much as 100 million gallons of used brine are discharged into streams in a year. A new recycling method developed by ARS now makes it possible to recover and reuse the salt from the brine, thus keeping it out of streams.

Without a salt recovery method, antipollution ordinances, if enforced, could drive some pickling plants out of business.

> Liquid waste from leather tanneries is also causing concern. Each year about 60 million pounds of hair from tanning operations are dissolved with lime and sodium sulfide. The liquid wastes are either discarded into streams, which they pollute, or treated by the tannery at great expense. Researchers are now investigating the possibility of using these wastes as a source of protein, which they hope can be recovered from dissolved hair and possibly used in animal feed.

ERS has been studying the comparative costs of two new methods of controlling pollution from fruit and vegetable canneries developed by ARS. One new method is "dry" caustic peeling of peaches in which the bulk of the peeling can be handled as a solid rather than a liquid waste. The other is the field processing of tomatoes in which the solid waste is left in the field. This method also reduces raw product transport requirements. Data collection for both studies is essentially complete, and analysis is underway.

California Experiment Station soil scientists were successful last season in disposing of 70,000 tons of peach and tomato peelings, cull fruit, and other waste from canneries on a 500-acre tract of farmland near Gilroy. Microbiological studies show that the soil consumed the wastes without deleterious residual effects, offensive odors, or insect annoyance. The project disposed of more than 70 percent of the solid wastes from San Jose's sizable cannery industry.

Livestock Wastes

Livestock wastes constitute one of the major environmental threats from agriculture, and a challenge to our agricultural scientists to find new, effective, and economical waste management systems. Livestock produce some 2 billion tons of waste each year: 1.2 billion tons of solid waste, 400 million tons of liquid, and 400 million tons of associated waste such as bedding and dead carcasses. However, the size of the real pollution potential is much less.

The animal waste problems are caused mainly by modern livestock production methods that concentrate the production of beef cattle, dairy, swine, and poultry in confined areas. Years ago when nearly every farmer was a diversified producer, the manure could be used on his crops. Today, with much of our livestock production confined to feedlots, disposal of wastes without endangering the environment poses a monumental problem.

Several research projects are studying systems for disposal of wastes on agricultural land, ameliorating the adverse effects of waste stockpiles, and using wastes without putting them on the land. This latter possibility includes investigating the use of lagoon effluent treatment systems, oxidation ditches, hydroponic and composting techniques, and reuse of wastes as sources of heat energy and more useful fertilizers.

> ARS scientists see opportunities in developing new chemical, physical, and enzymatic processes for converting animal wastes into livestock feed; recovering fertilizers from wastes; and working out economic methods for treatment close to production areas to eliminate objectionable effects and odors for nearby communities.

Extension sponsored livestock waste management demonstrations at eight sites in Iowa. Five demonstrations were conducted with open-lot operations and three with beef confinement operations. The results have been compiled and distributed for use by all Corn Belt States where the information is applicable.

Another demonstration project on feedlot waste management was conducted in the Southern Great Plains States. Six States are cooperating with USDA agencies in this effort.

These projects are helping feedlot operators learn about and adapt proven practices for designing, constructing, and operating feedlots to control pollution to the greatest extent possible at minimum costs. In addition, they identify areas where more research is needed and provide operators with more adequate information on socio-legal aspects of pollution from feedlot wastes.

> In Wisconsin, Extension specialists helped a turkey processing plant make operational and plant adjustments needed to keep the plant in operation and meet pollution abatement requirements. In California and New York, specialists worked with the poultry producers to meet environmental requirements with respect to manure, flies, and odors. Missouri Extension workers are promoting an animal waste management concept of "returning the waste to land" rather than treating it and dumping it into streams.
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> The Extension environmental quality agent in Dane County, Wisconsin, undertook an educational program to reduce pollution from agricultural sources, a major factor in Lake Mendota's eutrophication. Because of his efforts, many of the area's farmers are taking advantage of Federal

cost-share assistance to construct winter storage facilities for manure.

Recycling Wastes

Scientists are seeking effective ways to recycle waste materials found in sewage. In addition to making sewage waters clean and safe for human use, (as mentioned in last year's report from studies at Phoenix, Ariz.), they are exploring the possibility that some waste may provide a new source of materials for plastics. Polymers similar to thickeners used for oil-drilling muds have been found in sewage sludge. Converting these polymers to plastics would offer a valuable new use and eliminate a common water pollutant.

Recycling research at the Madison Forest Products Laboratory reached the pilot plant stage in October 1971. Following experiments that demonstrated methods of separating wastepaper and solid waste from municipal trash, the city of Madison, Wisc., constructed a 25-ton-per-day separation facility at the refuse reduction plant. Material separated from milled city refuse is now being evaluated for use in structural materials, with emphasis on dry-form hardboard. The wastes under study include waterpaper from household trash, discarded pallets and other dunnage, demolition wastes, and trees killed by Dutch elm disease.

Scientists have found a use for another discard product: Clippings from golf courses, lawns, and turf farms. The dried clippings have considerable potential as a poultry feed ingredient. One turf company is already deriving income from what recently was a waste disposal problem.

> Bacteria that attack and rot plants have been put to work by scientists at the Connecticut Agricultural Experiment Station to help dispose of solid waste. Bacteria of the Erwinia species were found to produce an enxyme, pectate lyase, which quickly degrades chopped household garbage. The liquified waste has potential as a feed supplement, a medium for growth of yeast, or a soil amendment.

Assistance in Controlling Air Pollution

Air pollution is now widely recognized as a problem of increasing dimensions. Agricultural scientists are providing new techniques that promise to be of value in controlling and minimizing this growing threat to a quality environment.

In a cooperative project ERS and ARS are evaluating performance, efficiency, and costs of alternative systems for controlling air quality at cotton gins. The results will assist ginners in improving environmental quality and in complying with pollution control guidelines. Another project is being developed to study alternative systems for controlling air quality at grain elevators.

Burning "empty" pesticide containers is prohibited in many areas because the containers are never completely empty, and because outside burning of any kind of trash is considered damaging to the environment. ARS and State experiment station scientists are testing a prototype incinerator for controlled burning that features a "scrubbing" system for cleansing the gases produced. The research also seeks to determine what materials should be used for pesticide containers to facilitate disposal by incineration.

> A few years ago smoke generated by smudge pots used to reduce frost damage in orchards became so bad that at times the airport at Yakima, Wash., had to be closed. This developed into such a spirited public controversy between fruit growers and town citizens that the county passed an antismoke ordinance. Led by the county agent, fruit growers are turning to new cleaner burning heaters. By 1971, the new type heaters were in use on 7,000 of the 35,000 acres needing frost protection. "It is a high compliment to growers that we had only one citation issued in 1971 for burning in open pots," declares the chairman of the Yakima Valley Clean Air Authority. The newer orchard heaters burn fuel more efficiently and produce only 1 percent as much pollution as the open pots.

A joint study of fire meteorology and the effects of air pollution on forest trees has proved the merits of multidisciplinary research. Data on daily variations of total concentrations of oxidants in the Los Angeles Basin are being used to develop a model of pollutant concentrations and smog damage potential for specific forest areas. Such information will help to answer such questions as: What species should be encouraged in smog-hazard areas? How can we breed smog-resistant trees? How can we use screens of trees to channel the flow of polluted air?

During the year the Forest Service completed an initial study on trees as bioindicators of low-level air pollution. Over 1,400 Eastern white pine seedlings were exposed to pollutants in the field. Four hundred thirty-five white pine exhibited specific sensitivities to either sulfur dioxide, fluorides, or oxidants. In various combinations of sensitivity-resistance outplanting, these trees can serve as low-cost monitors. As an added benefit, 64 seedlings were found to be resistant to all air pollution regimes. These may be useful where trees now are being killed by pollutants.

Contamination by Chemicals

The farming industry uses huge quantities of pesticides, herbicides, fertilizers, and other chemicals, some of which find their way into streams and lakes and even into food. Even with the use of chemicals, insects, diseases, and weeds take a heavy toll of agricultural production. Without their use, the structure of our agriculture would be altered, prices of some agricultural commodities would rise sharply, consumers would pay a substantially higher proportion of their income for food, and there would be a depressing effect on the American standard of living.

Obviously, the use of chemicals by farmers and ranchers—including which chemicals are employed as well as how and where they are used—is of major concern to environmentalists, agriculture, consumers, and the USDA. Since the solutions to the question of chemicals in agriculture is inextricably linked to research, we shall consider the matter in some detail in the next section of this report.

Let it be said here, however, that in response to the challenge, food inspection agencies monitor food supplies; researchers seek alternative methods and chemical materials that are less harmful and less persistent once they get into the atmosphere; economists appraise the economic impact of restricting or banning the use of selected pesticides and livestock feed additives; and communicators and educators are engaged in continuing campaigns to promote safety in the use of chemicals.

For example, 20 State Extension Services are conducting programs designed to reduce the use of pesticides to a minimum in controlling insect pests.

A new major phase of pest management is the use of "scouts" to survey insect infestations and determine when the use of chemical controls are justified. This procedure can be used to replace scheduled spray programs that call for periodic sprayings regardless of insect populations. An effective scouting program may reduce the number of insecticide applications by 30 percent.

In 1971, Extension-trained scouts and producers "scouted" more than 4.5 million acres of crops.

INVOLVING THE PEOPLE

The Department is reemphasizing its commitment to improve the environment through a new program entitled "Environmental Thrust." This is a nationwide citizens campaign in which USDA personnel throughout the country give guidance and support to volunteer community leaders, co-ops, groups, and organizations concerned with enhancing the quality of American life.

Extension has a major role in developing and launching the USDA Environmental Thrust Project. During 1971, 440,000 copies of the brochure announcing the project and 45,000 copies of the handbook listing guidelines for 22 projects were distributed to USDA county and State personnel, State and Federal rural development committees, and other selected organizations. These organizations, which include the American Bankers Association, Independent Bankers Association, Kiwanis, Lions, United States Chamber of Commerce, Future Farmers of America, and Independent Grocers Association, reviewed the projects to determine where they might participate with the greatest contribution.

In Cherokee County, Texas, the Extension landscape horticulturist helped conduct a landscape beautification contest among low-income families living in new homes financed by Farmers Home Administration. To guide the entrants, he set up three home grounds demonstrations. All of the families did an outstanding job of keeping their homes and surroundings in good condition, and the response to the contest was so good that money already has been provided for a contest in 1972.

Homemaker clubs in 49 of Wisconsin's 71 counties had special programs on beautification, water pollution, and land zoning, reaching all members and hundreds of nonmembers. Several clubs helped clean up river banks and clear away overhanging brush and trees from waterways so canoe trails could be established.

In every State, Puerto Rico, and the District of Columbia, 4-H youth helped to improve their communities and the quality of the environment. Many 4-H activities center specifically on such beautification efforts as improving roadsides, clearing lakes, beautifying areas around community buildings, helping to establish parks and picnic areas, conducting anti-litter campaigns, and assisting with educational programs to help combat pollution. The 4-H'ers work individually in clubs, and often in cooperation with other youth groups. Through 4-H programs, youth living in innercity disadvantaged areas are also a part of the action, helping to beautify run-down city areas and to improve vacant city lots for community use.

During the year, 372,165 4-H members were enrolled in community service and citizenship projects, many of them related to beautification of community buildings, parks, and other public areas: 66,671 participated in ornamental horticulture projects, and 68,252 in flower gardening. Nearly all local 4-H Clubs were involved in some type of community service program.

Thousands of Massachusetts 4-H'ers carried out a comprehensive anti-litter campaign in 1971. In one Virginia county, 2,500 youth, involved in 4-H projects dealing with pollution and its effects, studied the major sources of pollution, distributed litter bags, made posters about the environment, set up roadside cleanups, and wrote news articles on pollution. In Atchison, Kansas, 4-H members sparkplugged a community service project on flattening and saving cans which were then sold to a salvage company to raise money for a recreational area.

Environment: Who Pays for What?

The price tag on agriculture's pollution of the environment is blurred.

Costs of controlling agricultural pollution are large and will vary widely depending on what is considered necessary, desirable and possible. As understanding of methods and techniques of environmental quality control improve, these costs can be incorporated into economic analyses to improve the decisionmaking processes.

Obviously, without pollution abatement, society in general will suffer damages or social costs. Some pollutants can be reduced at the source, with industry bearing the added costs. Other pollution problems, such as municipal wastes, must be controlled by governments. Additional costs may be covered by government grants, subsidies, or other incentives.

The question of "Who pays for what?" would seem to depend on how clean we want the environment to be and how much society is willing to pay for it. What adverse effects is society willing to accept if steps are not taken to curb pollution? What is, or can be, our technological ability to reduce pollution and prevent new forms of pollution? Finally, how well will our legal-political and institutional structure facilitate achievement of what is physically and economically feasible?

Within the USDA an Environmental Quality Executive Committee has been established. It coordinates the Department's responses to Congress, the Office of Management and Budget, and the Council on Environmental Quality; and it initiates and reviews legislative and policy proposals pertaining to environmental matters. The Committee also provides guidance to Departmental information and training programs.

The Department, through its executive committee, is continuing its review of programs to determine how they can be modified to assist rural America in meeting its problems and fulfilling its responsibilities for maintaining a quality environment.

The Department's environmental program for the 1970's, as it is now taking shape, will include five chief elements:

- Identification, retention, and protection of land for agricultural production, with particular concern for Class I and II land, since it is of limited supply.
- Designing of new approaches to the use of land released from agriculture for esthetic and recreational purposes, especially around population centers.
- Stimulation of selected small- and medium-size growth centers around the Nation.
- Intensification of efforts to determine the capacity of land to absorb wastes and to design means of converting wastes into beneficial uses.
- Finally, modification in the use of agricultural chemicals, to include a number of biological control mechanisms that would replace the more toxic chemicals.

These five major drives will enable the Nation to promote agricultural prosperity and rural development without in any way doing violence to environmental concerns. We cannot promote the total welfare of the American people, or of agriculture and the American countryside, if we destroy the beauty and the natural resources which are so much a part of the essential character of this Nation.

PROGRESS THROUGH RESEARCH

"One . . . quality which has always been a key to progress is . . . our singular ability to harness the discoveries of science in the service of man."

From the earliest days of the U.S. Department of Agriculture, research has always been one of its most important and most fruitful responsibilities.

The impact of research and science on agriculture has been almost incredible. It has been largely responsible for our impressive gains in productivity. Total U.S. agricultural output in 1971 was almost one-fourth larger than 10 years earlier, despite a reduction of one-third in man-hours of labor and of 4 to 5 percent in the acres used for harvested crops. Since 1960 the average corn yield has increased 32 bushels per acre, or nearly 60 percent. Wheat yields have gained almost 10 bushels per acre, or more than 40 percent.

Farm output per man-hour has virtually doubled in the past 12 years—a feat which becomes more spectacular when we realize that there had been a similar doubling of output per man-hour in the preceding 12 years.

Different periods in national and world history bring different needs, and different needs required new emphases in research. Thus, today we must have not only a constant stream of research to enable producers to replace less productive means of farming and marketing with more productive methods but also a continuing flow of new information to help combat ecological threats, including the ever-changing insect and disease pests.

RESEARCH INCREASES FARMING EFFICIENCY

Let us look first at some of the developments of 1971 which promise increased agricultural efficiency or, in some instances, new products to improve the quality of American life.

Breeding New Plant Varieties

A new soybean variety developed cooperatively by the Maryland and Delaware experiment stations and ARS averages over 41 bushels per acre, more than 10 percent above the next highest yielding variety in the four-State Mid-Atlantic region. Named the Wye soybean, certified seed will be available for 1972 planting.

The year also saw impressive developments in plant breeding research of a more basic nature.

Through a revolutionary new breeding tool, called mitrochondrial complementation, plant geneticists have found a way to cut as much as 2 years from conventional 5-year breeding programs in incorporating hybrid vigor into new barley crosses.

> This biological chemical technique for testing hybrid vigor of proposed parent plants in the laboratory calls for mixing microscopic respiratory bodies from cells of proposed parent plants for barley crosses in a solution. If the mixture shows an intensified respiratory rate, as compared with the rate of either parent, the proposed cross has a high yield potential. This technique can reduce the number of field tests of experimental lines by eliminating those lines with low potential.

Since the efficiency of these biological predictions has been demonstrated for other crops and also for animals, mitochondrial complementation may eventually add a new dimension to all breeding.

Plant geneticists have observed for the first time the phenomenon of apomixis in a grain sorghum line. Apomixis is the ability to reproduce identical offspring in successive generations without sexual fertilization. This means that hybrid vigor can be maintained without a tedious system of controlling pollination. The existence of apomictic grain hybrid sorghum could increase opportunities for breeders to use superior gene combinations in hybrids. Scientists are looking for the same thing in corn, wheat, and rice.

Progress was made during the year toward the development of higher protein hard red winter wheats. As populations continue to grow, high protein wheat may become increasingly important nutritionally for people throughout the world. Far more protein per acre can be produced from wheat than from livestock.

The Agricultural Research Service and the Nebraska Agricultural Experiment Station, Lincoln, developed 26 wheat breeding lines with grains that are 2 to 3 percent higher in protein than present commercial varieties grown under Nebraska production conditions.

Alfalfa germplasm that is resistant to anthracnose was developed from commercial varieties and experimental strains. Until now there has been no defense for this disease which costs farmers in the Eastern United States millions of dollars annually.

Developing new crop varieties that are resistant to herbicides may be made easier as a result of new knowledge about how herbicides in plants become detoxified. Some herbicides, such as atrazine, act on plants by interfering with photosynthesis. An enzyme, glutathione-S-transferase, was found to react with atrazine in leaf tissue, detoxifying the herbicide before it could reach cells containing chlorophyll. Because of the presence of enzyme activity, some lines of plants are more resistant than others to herbicides. More resistant varieties can be developed. The new knowledge is also expected to aid in developing new herbicides that will be more selective, affecting only undesirable plants.

> Researchers announced the development of vegetable breeding lines with greater value in human nutrition in 1971. These include a carrot line with 20 percent higher carotene (vitamin A activity) than current market varieties; potato clones with high protein content, a potential source of protein; and cabbage lines with 2.2 times more vitamin C content than standard varieties.

Another plant-breeding discovery may alter the image of the sunflower in its native land, the United States. A restorer fertility gene will enable geneticists to breed sunflowers with consistently good yield and high oil content. This gene restores fertility to cytoplasmic male-sterile sunflowers, making development of hybrids possible. Variable inbred lines of flowers used up to now have often yielded poor results. Consequently, the United States has been producing less than one percent of the world's annual 3.68 million tons of sunflower oil.

Kenaf is a promising new U.S. crop source of raw material for paper pulp. Researchers of USDA and several State agricultural experiment stations compiled a comprehensive report on knowledge gained concerned cultural and harvesting methods, utilization, and pulping characteristics. Besides showing promise as paper pulp material, kenaf is an important world source of textile fiber for making twine, rope, rugs, and other products.

New Products and Processes

In addition to helping the Nation provide an abundance of food and fiber, agricultural research has an impact far beyond the confines of farm production. Out of research have come many new foods, improved clothing, more efficient industrial processes, and even new sources of medicinals.

In one research project, for example, ARS scientists found a way to reduce rubber processing costs. When mixtures of rubber latex and a derivative of cereal grains are curdled, rubber particles become jacketed with a matrix of the cereal derivative. After the cereal-jacketed rubber dries, it can be ground more easily with less expensive equipment than can conventional rubbers. When the powder is processed into cured rubber, the cereal derivative acts as a reinforcing agent.

> A new engineering system using a computerized matrix analysis system for plane wood structures has been devised by wood researchers at Purdue. With the new system an unlimited number of types of plane frames, arches, trusses, continuous beams, etc., can be analyzed and checked against certain built-in design considerations. A manual on the program is available. Structural analysis will be of value to designers, specifiers of materials, setters of construction standards, and others.

Food scientists at the Georgia (Griffin) station completed a 5-year project to develop economical new products from peanuts—

peanut chips and a peanut pie mix. The new chip is similar in size, color, and shape to existing corn chips, but it tastes and smells like roasted peanuts, providing a tasty new snack food. The pie formulation is a dry mix containing all of the ingredients necessary except eggs and water—a convenience food that could eventually rival the pecan pie in popularity. Peanuts have become Georgia's leading cash field crop—over 1 billion pounds in 1971. The new products should help to keep consumption high.

Cornell University researchers have perfected a new process for the production of mead—the honey wine of mythology and men of yore. The new process relies on a unique blend of acids, nutrients, and selected yeasts with the diluted honey. The wine is then "racked" or clarified for several months and aged for 2 to 6 years. A good mead wine will have a strong lemon color, a mild flavor and a slight natural carbonation. Americans now consume about 290 million gallons of domestic and 30 million gallons of foreign wine each year and enthusiasts expect the figures to double by 1980. The new product will provide a refreshing alternative to the fruit wines now dominating the market.

Researchers are developing a way to use enzymes in a continuous process that converts corn starch into glucose. Of several thousand known enzymes, only a few are used in large-scale processes because they are either lost in the product or waste or become deactivated. In the process being developed, the enzyme glucoamylase is bound to a white powdery substance called di-ethyl-amino-ethyl and is packed into glass columns. Starch solution flows into one end of the columns. Glucose flows out the other end.

In analyzing plant seeds, scientists at the Northern Marketing and Nutrition Research Laboratory in Peoria, Ill., have found more than 1,000 species that are rich in L-dopa, a drug used to treat Parkinson's disease. Some seeds had levels of L-dopa as high as 6.7 percent, compared with 3 percent, the highest level in previously known sources.

Seeds from the genus *Mucuna* are the most promising plant source of L-dopa found in the Northern laboratory research. The highest level was in seeds of *M. holtonii* from Guatemala. However, it has very poor crop potential for the continental United States. *M. deeringiana* seeds from Louisiana and Rhodesia yielded 4.8 percent of L-dopa. This species is grown for forage and soil improvement in Southern States.

Breakthrough in Swine Production Research

A major breakthrough in the freezing of boar semen promises to make artificial insemination practical for the swine industry. Heretofore, artificial insemination of swine was impractical because boar semen lost its fertilizing capacity soon after collection. In experiments using a new additive with the semen and a special semen handling procedure, researchers obtained pregnancies in 10 of 12 sows.

Research developed these foods: A cream and cheese whey spread; cheese made from skim milk; cottonseed flour crackers; a pinto bean dip; and low fat peanuts.

Flame-retardant cotton sleepers.

Scientists are hopeful that with further research and refining of methods, widespread commercial use of artificial insemination will be possible for the swine industry. Artificial insemination has been widely used in the dairy and beef cattle industries for a quarter of a century.

Research on Harvesting and Market Quality

Research to improve harvesting techniques enables consumers to receive an abundance of uniform high-quality products more economically.

A major obstacle to mechanization of the sweet cherry harvest may have been hurdled when successful tests were made with an experimental fruit loosener, CEPA (2-chlorethylphosphonic acid).

Presently most cherries are picked by hand because of the difficulty of separating the fruit from the trees. By aiding the development of pithy cells at the base of the stems, CEPA promotes normal separation of cherries. It supplies ethylene, a nontoxic ripening agent that occurs naturally in most fruits. Use of CEPA shortens the shaking period required for fruit removal; more of the crop is recovered and there is less fruit damage.

CEPA also aids rubber harvesting by promoting the oozing of latex from rubber trees. It may also prove useful in harvesting maple sugar and pineapples.

An inexpensive new foam makes it possible for vegetable growers to protect their early-grown crops from unexpected spring freezes. The foam is nontoxic to plants, is biodegradable, and lasts throughout a one-night frost to disperse in the heat of daytime temperatures. ARS engineers designed a foam generator to apply the foam on rows of crops.

Agricultural engineers also developed a modified standard root plow for subsurface placement of herbicides into the soil. A number of woody plants are resistant to herbicides applied as foliar sprays.

Market quality research helps producers and marketers get food and fiber to consumers at peak quality and with minimum damage. The Department cooperated with State agricultural experiment stations during the year in studying factors affecting the post-harvest quality and market life of fruits, vegetables, and nuts. Several modifications of mechanical harvesting equipment were tested.

Besides increasing efficiency, especially through savings in labor, mechanical harvesting reduces bruising. Progress was made in harvesting practices, and studies are continuing with materials and techniques used in post-harvest handling and grading to minimize injuries and decay, and to extend the shelf life of mechanically harvested products.

The quality of orange juice, whether freshly squeezed or processed, must be maintained. Market quality research on citrus produced a new process to prevent orange juice from separating, with the solids dropping to the bottom of the container. Other achievements included a procedure to mature citrus after harvest and unitized loading methods to cut citrus handling costs.

> Premature decay is a big problem with citrus, as with many fruits and vegetables. ARS scientists are researching ways to curb this decay. A new fungicide, TBZ (thiabendazole), tested under laboratory and simulated market conditions, protected citrus fruit against post-harvest decay better than most of the widely used commercial treatments. TBZ is nonallergenic, nontoxic, has no adverse effect on the aging, appearance, or taste of the fruit, and is economical to use. It costs only about 1 to 1½ cents per 90-pound box of fruit.

New ways of reducing decay of strawberries, one of nature's tender fruits, during transit and of increasing the shelf life of air-shipped strawberries are proving effective.

Determining the internal quality of thick-skinned fruits, such as watermelons, citrus, pears, and apples, has long been a problem. The usual methods often damage the fruit by bruising or puncturing the skin. A new process measures the response of a fruit to sonic vibrations. It evaluates firmness, juiciness, and overall eating quality without damaging the fruit.

ARS is continuing to study under field conditions an X-ray selector that gives lettuce an electronic squeeze to determine its readiness for the table. The X-ray selector does not touch the heads, as do mechanical selectors, thus eliminating possible damage.

Brown stain on head lettuce makes the product unattractive to consumers. Scientists have linked the stain to higher than normal levels of carbon dioxide (CO_2) during shipment in rail cars. The higher the average CO_2 concentration during transit, the higher the incidence of brown stain at destination. Researchers are now seeking a satisfactory method for preventing the accumulation of injurious levels of CO_2 during shipment.

Since potatoes are a staple in many diets, researchers seek effective methods of providing fresh potatoes throughout the year. To do this through a long storage season requires control of temperature, air movement, and humidity. Scientists at the Red River Valley Potato Research Center, East Grand Forks, Minn., have successfully maintained 90 percent relative humidity in storage structures while allowing for control of other internal environmental conditions. With these controls, potatoes can be shipped all year round anywhere in the country and still retain excellent condition.

This research has also produced a revolutionary concept in potato storage facilities—a circular storage structure which combines better utilization of space than the customary rectangular types along with greater efficiency and economy of operation.

Insect attacks on stored products cause losses of millions of dollars every year. Various means for detecting infestations have been developed or proposed, including chemical, electrical, X-ray, and aural methods. Since each of these has certain major disadvantages, research is looking to nuclear magnetic resonance (NMR) as a promising answer to insect detection.

> NMR is a well-known tool in physics. It has been used to determine moisture in wheat, flour, and dough, and to analyze soybean oil content. It is believed that moisture and protein within the insect's body trigger the NMR response. In any event, NMR reveals the presence of insects inside kernels and promises future use to detect insects in stored products.

In another development, carbon dioxide treatment has been used to control stored grain insects as effectively as conventional fumigation measures without residues or insect resistance problems. Although additional tests are needed before the CO_2 treatments are ready for practical application, these treatments will be looked to as part of the Department's continuing efforts to combat insects pests safely.

Market quality research produced other diverse finds during the year. An electronic "egg" has been developed to "guinea pig" high-speed mechanized grading and packing lines in commercial plants and to help the egg processing industry reduce breakage losses on a revolutionary computerized system to speed up supermarket checkouts. Another electronic device monitors the removal rate of milk residue during the rinse phase of the cleaning cycle in milk processing plants. A newly developed scanning electron microscope is expected to play a large role in the future of cotton textiles.

> A recent marketing research study indicates that the broiler industry could save up to $15 million annually by packing and shipping dry-ice packed poultry instead of water-ice packed poultry. In addition, receivers prefer the dry-ice packed product because the packed boxes are lighter, have less drainage, are easier to handle, and appear more sanitary.

CONTROLLING PESTS AND DISEASES

Researchers fight a continuous battle against pests and diseases which pose a never-ending threat to crops and livestock. One of the important reasons why American consumers enjoy an abundance of high quality, reasonably priced food and other agricultural products is to be found in the effective pest and disease control made possible by USDA research and regulatory programs.

To increase the effectiveness of the Department's protective action, a separate Animal and Plant Health Service (APHS) was established on October 31, 1971. The new agency carries out the animal health, veterinary biologics, plant protection, and agricultural quarantine and inspection programs, formerly administered by the Agricultural Research Service.[3]

Controlling Livestock Pests and Diseases

Containment of an epidemic of sleeping sickness, Venezuelan equine encephalomyelitis (VEE), highlighted animal disease prevention activities during 1971.

Formerly regarded as a foreign, tropical disease, VEE reached Texas in June as the crest of an epidemic that originated in South America. The disease affects horses, other equines, and humans.

Cooperative efforts to control and block the epidemic in Central America and Mexico were unsuccessful in keeping VEE out of this country. Once the disease was confirmed in Texas, a national emergency was declared and an intensive State-Federal effort was launched to combat it.

USDA joined with the Department of Defense (DOD), the Department of Health, Education, and Welfare, and many State and local forces to combat the disease. Over 2.8 million horses were vaccinated in 19 States and the District of Columbia. More than 13 million acres were treated with insecticide along the gulf coast of Texas and Louisiana to kill mosquitoes that transmit the disease. The vaccine used in the fight was developed by DOD and made available by APHS to veterinarians who administered the vaccine at Federal expense. The disease was successfully confined to 25 counties in south Texas. VEE was diagnosed in fewer than 100 people in Texas, and fortunately none died.

The cooperative State-Federal Hog Cholera Eradication Program appears to be headed down the final stretch toward the goal of a hog cholera-free United States by the end of 1972. Cases declined sharply from 679 in calendar year 1970 to only 111 positive cases in 1971, with all but 11 cases occurring during the first 6 months. Thirty-one States have been declared hog cholera-free, 14 of them during 1971. All other States except Texas are in phase IV, the surveillance period to make sure the disease is eradicated.

> Even so, APHS officials find cause for continuing concern. In mid-December, two positive cases of hog colera—in an extremely virulent form—were found in southern Texas, with considerable exposure to other herds through contact in a livestock sale. Infected and exposed herds have been destroyed, and the disease is being traced back to its herd of origin.

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[3] On January 19, 1972, a further reorganization was proposed: The establishment of an Animal and Plant Health Inspection Service (APHIS). The new agency would carry out all of the activities of the Animal and Plant Health Inspection Service, plus meat and poultry inspection and related functions.

No cases of sheep scabies were found during the year. Ten years ago sheep scabies were costing producers nearly a million dollars a year. The program to free the United States from this disease was climaxed in 1967 when Iowa became the last State to be declared free of sheep scabies.

Cases of cattle scabies, however, were found in Texas, Oklahoma, Nebraska, New Mexico, and Kansas. The State-Federal quarantine is controlling cattle shipments out of 34 panhandle counties in an effort to halt the spread of the disease. More than 90,000 head of infected cattle were found and treated in the drive to stamp out the worst cattle scabies outbreak since 1969.

Screwworms again invaded the United States from Mexico with 443 cases occurring during 1971, compared to 153 cases in 1970. Texas reported 404 cases, Arkansas 25, and Arizona 4, making this the worst year since 1968 for the screwworm eradication program when 9,877 cases were reported.

> An unusual occurrence was the screwworm outbreak in Texarkana, Tex., and nearby Arkansas. This isolated but persistent infestation was first found on June 24, 1971, and resulted in 56 cases in a three-county area of Texas and Arkansas. Animal health officials theorize that the infestation was started by an infested animal that was shipped into the area. A thorough spray program and regular sterile fly drops ended the outbreak.

The continuing screwworm eradication program in Puerto Rico and the Virgin Islands involves dropping of sterile flies twice weekly by the 317th Special Operations Squadron of the U.S. Air Force. Approximately 2 million sterile flies were flown weekly from the rearing facility at Mission, Tex., for distribution over the islands.

Two major findings in poultry disease research were announced during the year. One was the licensing of a vaccine, developed at the ARS Regional Poultry Research Laboratory, East Lansing, Mich., to protect chickens against Marek's disease. This highly infectious disease has been recognized in this country since the early 1900's. It has caused losses estimated at $200 million annually to the U.S. poultry industry.

The other major finding had to do with the development at the ARS National Animal Disease Laboratory, Ames, Iowa, of a highly effective *killed*-virus vaccine for Newcastle disease of poultry. Presently, about 95 percent of the poultry hatched in the United States are immunized against Newcastle disease with a *live*-virus vaccine placed in their drinking water. This method is fast, easy, and inexpensive, but its use perpetuates the disease agent in poultry flocks. The killed-virus vaccine, which is still in experimental use, could play an important role if a nationwide eradication program for Newcastle disease were to be started.

The University of Wisconsin announced the development of a promising preventive for milk fever, a disease that costs dairymen millions of dollars annually. The preventive material is 25-HCC, an active form of vitamin D. About 70 percent of cows with milk fever die if untreated. When given to dairy cows in capsule form at least 18 hours before calving, 25-HCC has reduced the incidence of the disease about 85 percent in cows with a previous history of milk fever. The estimated cost is approximately one to two dollars per cow.

Meat inspectors reject about 200,000 beef carcasses each year because of "beef measles," or white cysts in meat infected by the tapeworm. An Arizona station parasitologist reports an effective vaccine produced by irradiation. Eggs of the tapeworm are treated with cobalt 60, then injected in young calves. When challenged with viable eggs 8 weeks after treatment, the vaccinated calves averaged only 87 cysts compared with 2,746 in the nonvaccinated group. In economic terms this can represent a $300 benefit for each carcass saved from total rejection during meat inspection. The finding has immense importance abroad where the problem is more serious. In one African nation about one-third of the carcasses are infected.

Controlling Threats to Plant Life

One of the most significant findings to come out of agricultural research during 1971 was the isolation and identification of a new kind of disease-producing particle, smaller than a virus. This particle may hold clues to the elusive nature of some human diseases.

The newly discovered infestious particle is characterized as a tiny molecule of free RNA (ribonucleic acid). ARS scientists at Beltsville found it to be the cause of potato spindle tuber disease. Although the disease has been known for over 50 years, the nature of the casual agent had previously been undetermined. Because of its great difference from viruses, the name "viroid" has been proposed for this new pathogen.

Approximately one-eightieth the size of the smallest known virus, the viroid is able to reproduce itself in living cells—the first time an RNA molecule of such small size has been shown to be self-replicating. ARS scientists speculate that other plant diseases, and possibly some diseases of animals and humans, such as multiple sclerosis, infectious hepatitis, and even some types of cancers, may have viroid origin.

During 1971, for the first time scientists demonstrated under field conditions that pollution reduces yield in a major agricultural crop, sweet corn. Other field studies on other crops are underway. Previously, pollution damage has been shown mainly in the laboratory with deleterious effects measured by visible injury to the plants or by the physiological responses of the plants.

Motor vehicle exhaust is the primary source of ozone, which is formed as sunlight breaks down the products of motor fuel combustion. Using levels of ozone lower than those commonly found in many urban areas, ARS scientists exposed commercial varieties (Golden Midget and White Midget) of sweet corn to charcoal-filtered air containing three different levels of ozone for 6 hours each day from the time the corn emerged to harvest.

In both varieties the number of kernels per ear declined by about one-third. The weight of the kernels was also reduced. In addition, the plants of the Golden Midget were shorter and lighter in weight.

> Cornell researchers have developed a "quick" test to screen corn plants for resistance to leaf bright. The toxin produced by the disease-causing fungus is sprayed upon or injected into 2- to 3-week-old plants. Within 3 days, susceptible individuals show streaks of dead tissues in one or two leaves. In addition to the obvious benefits from not using potentially dangerous live organisms, the method drastically cuts down on the time required in plant selection. The new method can do 6 years' worth of work within 2 years, hastening progress on the control effort.

Among other 1971 highlights in research related to plant health were the discovery of frost resistance in 56 clones of interspecific hybrids of potatoes, development of a potato selection that is highly resistant to the northern nematodes, and development of potato and onion lines resistant to air pollution.

Researchers also devised methods of indexing seed lots for fizzle-top virus infection in pea seed. This development, coupled with assistance in indexing commercial seed lots, enabled the pea seed industry to eliminate seed lots with infected seed. It helped to bring this seed-borne virus disease under control, averting a potentially hazardous spread of the disease.

New Anti-Insect Campaigns

A highly interesting experiment in insect control, and one which may have great potential for use in campaigns against other pests, was the pilot boll weevil eradication experiment carried out in southern Mississippi and nearby parts of Alabama and Louisiana.

In this area workers encountered the most difficult boll weevil conditions to be found anywhere in the United States. Yet they succeeded in sharply reducing populations of this cotton pest by the end of the season.

An integrated program was used, combining insecticides with cultural and biological control methods.

> The experiment started July 1, 1970, and is slated to run through June 1973. It employs four major techniques in a phased sequence: (1) Late season suppression of weevils before they achieve diapause—the biological condition necessary for hibernation; (2) cultural treatments at harvest time, such as defoliation and stalk destruction of the cotton plants to eliminate the environment needed by boll weevils; (3) pheromone traps, which lure weevils with a chemical

Much enlarged closeup of the cotton boll weevil.

Preparing boll weevil traps for large-scale field trial.

attractant similar to the natural one produced by male weevils; and (4) the release of thousands of sexually sterile male boll weevils to stop the natural reproduction of the remnant population in the field.

Through funded university research and experimentation by our own scientists, new methods were discovered that make possible mass rearing of three species of tiny wasps which parasitize the cereal leaf beetle. Field insectories for laboratory rearing of the parasites were established in Michigan. Eventually, an insectory will be established in each State infested by the cereal leaf beetle. After the new mass rearing and release program went into effect during the summer of 1971, nearly 700,000 egg parasites were released at 109 locations in eight infested States; another 65,000 larval parasites were set free at 11 sites in four States.

A mixed bag of weapons was also used to counter the spread of gypsy moths—forest pests that defoliated trees on approximately 2 million acres in the Northeast in 1971. Quarantines and treatments with nonpersistent chemicals prevented long-distance spread. Traps baited with synthetic lures discovered natural spread into new areas. Wasps that parasitize gypsy moth eggs were then released at the site of each catch.

During the year numerous field tests of disparlure were carried out with excellent results. This is a synthetic sex attractant that duplicates the lure put out by female gypsy moths to attract males. The Department is cooperating with the Pennsylvania Agricultural Experiment Station in a 2½-year study of the use of this artificial lure as a control weapon.

Citrus blackfly, a scale insect that is one of the world's worst pests of citrus trees, invaded Brownsville, Tex., in April, the third invasion of the United States by this pest. The emergency cooperative control program initiated by USDA and the Texas Department of Agriculture has not yet eradicated the blackflies. It has, however, prevented the pests' spreading beyond this small border town.

Methods to apply remote sensing techniques to plant pest detection programs indicate that color infrared photography is effective in detecting the citrus blackfly, sugarcane root borer, and burrowing nematode.

Quarantine Inspection Program

In the continuing effort to keep some plant pests, diseases, and prohibited animal products from entering the country, agricultural quarantine inspection agents examined millions of pieces of luggage, hand-carried packages, and inspected ships, planes, and automobiles coming from abroad.

More than 800,000 lots of unauthorized agricultural material from baggage, cargo, mail, and ship and airplane stores were seized.

Approximately 40,000 major pests were intercepted during 1971. These pests—foreign insects, mites, snails, nematodes, and plant diseases—can cause millions of dollars of damage to United States crops, gardens, and forests. The Mediterranean, olive, oriental, and European cherry fruit flies continued to be the major fruit-fly pests intercepted.

Agents inspected nearly 1 billion pounds of admissible animal products (other than meat for human consumption) destined for agricultural, industrial, or pharmaceutical use. Fifteen percent required further AQI control until processed. More than 8 million pounds of prohibited animal products were seized.

During 1971, 15.7 million air travelers entered the country, and inspection of air-traveler baggage totaled over 43 million pieces. More than 1 million ship passengers entered the country; 3.6 million pieces of baggage were inspected.

In cooperation with the Departments of Defense and Health, Education and Welfare, USDA precleared military cargoes and carriers from Vietnam for pest-free entry into the United States. In 1971, nearly a half-million tons of military cargo was precleared.

> The coffee berry is a popular tourist souvenir and a favorite host of the destructive Mediterranean fruit fly. AQI inspectors in Hilo, Hawaii, intercepted numerous lots of coffee berries discovered in such unique hiding places as: The pocket of an "aloha" shirt, neatly folded in a suitcase; buried in a can of black sand; the side pocket of a camera case; a lady's purse wrapped in kleenex; vitamins and other pill vials; a school teacher's assorted collection of things she found to take back to show her students; mixed with a smelly shell and coral collection.

Two types of snails were found in the belly of a ceramic elephant by Houston, Tex., inspectors in November. The shipment of 228 crates of ceramic elephant stools originated in Saigon, and although the snail specimens were dead, live snail eggs were found. Since removal by hand was not feasible, the shipment was fumigated to pass inspection.

A passenger from Ecuador arrived in New York with a large amount of canned seafood, all with well-known commercial labels. Inspectors detected a difference in weight in some of the cans having similar labels. On opening three cans, two were found to contain sausages and one fresh naranjilla fruit.

Cookies in two round cans appeared to be cookies until the inspector in Jamaica dug deeper. Separated from the cookies by a layer of waxed paper, he found about eight pounds of meat surrounded by lard in each can.

Most travelers who attempt to "smuggle" food into the country do so thoughtlessly or as a prank. Such thoughtless pranks, however, can enable pests and diseases to gain a foothold in the United States and eventually to cause enormous damage.

Safeguards to Human Health

The USDA protects human as well as pet and livestock health by controls over the biological products used against animal diseases, some of which are transmissible to man.

Continuous surveillance and testing of veterinary biologics kept nearly 75 million doses of unsatisfactory products off the market during the year.

In some cases, drastic action was initiated to prevent continued unsatisfactory production. Following an APHS investigation, Hoosier Veterinary Laboratories surrendered its license and ceased operations. Dellen, Inc., was forced to cease production and eventually also surrendered its license.

Only after a complete reorganization of the company under new management was a new license granted. The former president and controller of the company have been cited for criminal prosecution by the Department of Justice. Two additional licensees, William Cooper & Nephews and Ranel Laboratories, Inc., were subjected to a stop-sale order and a protracted halt in production until serious irregularities were ironed out.

THE QUESTION OF CHEMICALS IN AGRICULTURE

We alluded earlier to the problems arising from agriculture's use of chemicals which, in some instances, get into streams and lakes and persist in soils and even foods. Researchers have been, and are, investigating the consequences of eliminating certain chemicals from agricultural use.

Organochlorine insecticides have become increasingly important to farmers in the production of four crops—cotton, corn, peanuts, and tobacco—which together account for about 87 percent of the farm use of these insecticides. The organochlorines are highly effective, but they persist in active form and hence accumulate in soils and streams. Substitute pesticides, the organophosphates and carbamates, have been developed that are effective on most insects (of the four crops) including rootworms but less effective on other soil insects. About 50 million of the 80 million pounds of organochlorines used annually could be replaced by 40 million pounds of the substitute insecticides at an added cost averaging $2.25 per acre treated, or $25 million. This added cost would be equivalent to 0.3 percent of the farm value of the four crops. About 15 million pounds of organochlorines would still be needed to provide effective control of insects on cotton and corn as now grown. With such a substitution, entailing relatively minor additional costs to farmers, the impact on consumers of farm products would be insignificant.

Farmers now use about 44 million pounds yearly of phenoxy herbicides (chiefly 2,4-D and 2,4,5-T) on 62 million acres of cropland. If these herbicides were not available, farm production costs would increase by about $290 million. This represents about 1 percent of the value of all farm crops, or 5 percent of the value of the crops from the treated acres. The increased cost would be nearly three times the total amount now spent for weed control, with phenoxy herbicides constituting an increased cost of $4.65 per treated acre. Most of the increased cost would be on corn, wheat, other small grains, pasture, and rangeland. Alternative methods of controlling weeds include handweeding, spot treatment, and crop rotations that include cultivated row crops. Nonuse of herbicides on fence rows, ditch banks, and other noncrop areas would allow weed infestations to build up.

The increased cost of prohibiting the use of just one herbicide, 2,4,5-T, for all nonfarm as well as farm uses would be about $52 million. Nonfarm uses—roadsides, rights-of-way, and others—account for four-fifths of the nearly 9 million pounds used annually. If 2,4,5-T were unavailable but other phenoxy herbicides were available, the net increased cost of using alternates would be about $32 million for farm use and $20 million for nonfarm use. If neither 2,4,5-T or the other phenoxies were available the additional net cost of alternative means of weed control would be $44 million on farms and $128 million on nonfarm uses, for a total of $172 million. The largest additional costs for nonfarm uses would be the control of weeds in rights-of-way of all kinds.

Diethylstilbestrol

A commonly used additive in cattle feeding is diethylstilbestrol (DES), a synthetically produced hormone that stimulates body growth in contrast to excess fattiness that is usually associated with high energy feedlot rations. Use of DES in feedlots increases feed conversion efficiency, shortens the feedlot period, and is cheap. DES is now fed to 90 percent of all feedlot cattle—most of the steers, some of the heifers, none of the bulls. The charge against DES is that it can get into the meat and it may be a cause of cancer in humans.

The annual cost of consumers of banning DES for feeding beef cattle could range between $300 million and $460 million—or as high as 3.5 cents per pound of beef.

Tests show that DES does not show up in the meat if DES is removed from the feeding ration 48 hours before the animal is slaughtered.

Late in 1971 the USDA announced a mandatory certification program for DES to begin January 8, 1972.

Under the new program, Federal meat inspectors will hold all cattle and sheep from slaughter at least 7 days unless the animals are certified as not having been fed DES, or as having been withdrawn from DES at least 7 days before slaughter.

The new program provides three alternatives for handling cattle and sheep at slaughter:

(1) The animals may be slaughtered if certification requirements have been met; or

(2) The animals will be held alive for the required 7 days; or

(3) The animals may be slaughtered, with samples sent to a USDA-approved laboratory for testing. Meat from the animals cannot be marketed until the tests prove they are free of DES residues.

Constant Search for New Control Methods

USDA scientists, using various disciplines, are gaining new knowledge for developing integrated pest control programs.

Sex attractants are useful in some of these control programs, especially in surveying areas of pest infestation. Sex attractants of about 30 insects have been identified. Of the recent discoveries, scientists found that female southern armyworms attract males by producing two compounds that act together. These compounds were synthesized in the laboratory. Discovery of this pest's sex compounds may make it possible to detect infestations before they become widespread.

We referred earlier to the use of disparlure and tiny wasps against the gypsy moth. Microbial insecticides, such as *Bacillus thuringiensis*, are being considered by research scientists as future weapons against the gypsy moth.

Our scientists recently found that a fungus, *Hirsutella thompsonii*, produces spores that infect citrus mites, killing them within 72 hours. The fungus offers 12-week protection—twice as long as prior methods—without polluting the atmosphere. A tiny wasp barely larger than a pinhead preys on the fiddler beetle, which attacks the leaves and roots of citrus. Other nonchemical methods of pest control are being field tested on a regional basis to determine feasibility.

Aquatic weeds cost the Nation tens of millions of dollars annually. They interfere with navigation, prevent fishing and recreation, depress real estate values, and present health hazards.

In the past herbicides have been used against water-clogging weeds, but many herbicides are harmful to fish. In parts of the South, researchers have used weed-eating mammals like the manatee to rid waterways of weeds where the water is warm year round.

Scientists have now found that an aquatic weed-eating insect, *Parapoynx allionealis*, has potential for controlling Eurasian watermilfoil, a pesky water-clogging weed. Research teams are evaluating its practicality for control and will conduct studies to assure it does not harm useful plants. As often happens in scientific research, the discovery of this insect came as an unexpected bonus from studies on raising weeds for scientific observation.

> A cooperative State-Federal research project has shown that slender spikerush will compete with water-clogging weeds and eliminate the need for herbicides. Tried in two canals and a reservoir in central California, it grew well under water or along banks, even during the offseason when irrigation canals usually are not carrying water.

In addition, herbicides have now been developed that will control aquatic weeds without harming fish. Disquat, one of these herbicides, is now registered for use on aquatic weeds.

In another development, *Zectran*, a highly selective, nonpersistent chemical substitute for DDT to battle the spruce budworm and the jack pine budworm, has been approved for registration by the Environmental Protection Agency. These insects have caused extensive environmental and ecological damage to North American forests. A survey by the Forest Service shows 5.7 million acres of U.S. forest lands damaged by the budworms.

Zectran was selected from a list of 130 chemicals, and extensive research, field tests, and control studies were conducted from 1964 to the present before it was accepted. The success of this chemical may open doors for testing it against other serious defoliators, including the gypsy moth.

The Department is proceeding to implement a broad new pest management action program and expanded research program to help farmers control pests more economically and effectively, while at the same time reducing the amount of DDT and other chemical pesticides currently being used.

This program provides for a combination of chemical, biological, and cultural pest control techniques as well as long-range pest control research. It should enable farmers to reduce pesticide use in 1972 and later years. It will help farmers develop integrated control techniques for protecting crops and livestock from insects and diseases while reducing agriculture's production costs and protecting the Nation's consumers from increased costs for food and clothing.

The program will have other benefits. It will help safeguard the environment from the effects of currently used pesticides, as well as protecting farmers, farm workers and their families, and the public from the possibly harmful effects of more toxic materials that might be used as substitutes for DDT or other chemicals.

The program will be conducted jointly by the U.S. Department of Agriculture, the National Science Foundation, and the Environmental Protection Agency, in cooperation with State Departments of Agriculture, and State Agricultural Experiment Stations and Extension Services.

INTERNATIONAL RESEARCH

Foreign scientists, working under Special Foreign Currency Research Program grants awarded by the USDA, are contributing knowledge and technology for the advancement of agriculture in developing countries, as well as benefiting U.S. agriculture. The research is paid for out of U.S.-owned foreign currencies which cannot be converted into dollars.

In calendar year 1971, the USDA entered into 72 new grants for agricultural research, under the Special Foreign Currency Research Program, for a total of $4,580,700 equivalent. Results obtained during the year have resulted from contracts signed in earlier years.

> In a Korean project, scientists produced a statistical gauge for computing the energy needs of any population group of known composition and with known activities. This basic data is useful to the United States in estimating food needs for developing countries in the Far East. Heretofore, figures used to plan exports and food aid have been primarily adapted from studies involving U.S. occupations and populations. One striking difference shows up in the recommended daily caloric intake. For the average American male engaged in moderate activity the recommendation is 2600 calories; for Korean males the recommendations range from 2700 calories (light work) to 3600 calories for heavy work.

In 1971, Yugoslavia for the first time exported sizable quantities of hybrid seed corn to the United States. This was important to U.S. corn growers because of the severe 1971 shortage of seed corn resistant to corn blight. The Maize Research Institute in Belgrade developed the seed.

Rare compounds, isolated from exotic plant gums by Indian scientists, will help USDA chemists select new types of polysaccharides suitable for industrial and medical uses. These rare compounds will be chemically "fingerprinted" and used as reference models in research on starch-derived polysaccharides. The aim is to produce new types of industrially useful polysaccharides from cereal grains to supplement or replace the more expensive plant gums now imported from abroad.

From India, the United States has also obtained cantaloupe germ plasm with genes for resistance to powdery and downy mildews, watermelon mosaic virus 2, the melon aphid, and the fruit fly. These diseases and insects cause losses in the United States.

Israeli scientists have demonstrated that small differences in high-quality feeds can affect protein utilization by cattle, sheep, and other ruminants. In feeding tests, supported by biochemical studies, they found high-quality forage superior to high-quality oilseed in protein efficiency. A 50-50 mixture of soybean and alfalfa proteins is a better feed than either fed alone.

When diets of young children are protein-deficient, at what stage is intellect stunted, and at what stage is this condition preventable by an adequate diet? Indian scientists, in experiments with rats, have provided information basic to understanding the widespread problems of protein malnutrition, especially as it may affect mental development and the functioning of the central nervous system. Their studies confirmed that the effect of protein deficiency on behavior and brain biochemistry varies with the age at which malnutrition occurs.

This brief listing of recent agricultural research achievements indicates the many ways in which agricultural research, much of it carried out in cooperation with the States, continues to contribute new knowledge for the enlargement of human life.

Agricultural science will undoubtedly continue to produce wonders which will determine in part the kind of agriculture by which America will be served, the quality of our environment, the standard of living we will enjoy, and, indeed, the type of world in which we live.

SHAPING THE FUTURE

"1972 is before us. It holds precious time to accomplish good for this Nation."

Our Nation and the world stand on the threshold of what may be man's most revolutionary and productive era. The space age, the use of fissionable material for constructive rather than destructive purposes, the acceleration of scientific knowledge, the opening of new doors in the quest for peace and security—all these can shape a brighter future for man than he has ever known before.

Day after day, new marvels of industry, agriculture, and science are presented to make living better and easier. If the threat of war can be removed and the new productive techniques unleashed for peaceful and fruitful purposes, then our children may indeed be able to enjoy tomorrow a slumless America in which such economic diseases as poverty and malnutrition will be as rare as smallpox and diphtheria are today.

Ours is an economy of abundance, and agricultural abundance is a cornerstone of that economy. If we are to shape and eventually arrive at the future of our desires, we must maintain a productive, free, and increasingly prosperous agriculture. This implies assurance to farmers that they will not continue to be penalized, as they have for so long, for answering the call to produce abundantly.

I am pleased to be able to conclude this report with optimistic forecasts concerning the future of American agriculture.

Economically speaking, the immediate outlook is brighter than has been the case for some years. Farmers may take in as much as $3½ billion more gross income in 1972 than in 1971—or around $62 billion—which means that agriculture in 1972 will be a mighty good customer in the American economy.

Realized net farm income in 1972 should be about $1½ billion to $2 billion higher than in 1971, or around $17.5 billion—the highest in history.

The average realized net income per farm will also be the highest on record—an average of about $6,150, or around $700 higher than in 1971.

This will be an important step toward shaping the kind of future for American agriculture that is vital to the Nation.

Looking farther ahead, we can discern other reasons for optimism about agriculture's future. Although no one can predict with certainty what lies ahead, there are many indications rich with promise. By 1980 it is estimated that we will be a Nation of 230 million people with—

- A Gross National Product approaching $2 trillion—
- A total consumer income, after taxes, 50 percent larger than in 1970—
- A per capita purchasing power about one-third higher than in 1970.

This adds up to sharply increased demand for agricultural products, and especially for meat, including poultry, feed grains, and soybeans.

This is agriculture's coming market. These are the changes that lie ahead. This is the shape of the future.

In adapting to the future, farmers will have the huge advantage, one they had surrendered for many years, of making far more of their own planting and operating decisions. Greater efficiency will be the result, and greater flexibility in making needed adjustments.

Since the future of agriculture will be inevitably shaped by the nature of our economy, it is of the utmost importance that inflation be curbed. In the immediate future this means that phase II of the economic plan *must* succeed. Only in a sound economy can agriculture truly flower and grow.

Just as our opportunities are unprecendented, so also are our responsibilities. Our real problem is not our strength as a Nation today. Our real problem is to do now what will shape our strength in the future.

To some, our modern era of collapsed time—of exploding knowledge—of almost instantaneous communication to speed the application of research and technology—a time in which the pace of change seems to grow almost geometrically decade by decade—is frightening. But to those who are realistic enough to be idealistic it is challenging and exciting.

Someone has said, "We cannot predict the future but we can invent it."

It is the challenge of our generation to invent and shape a future worthy of mankind.